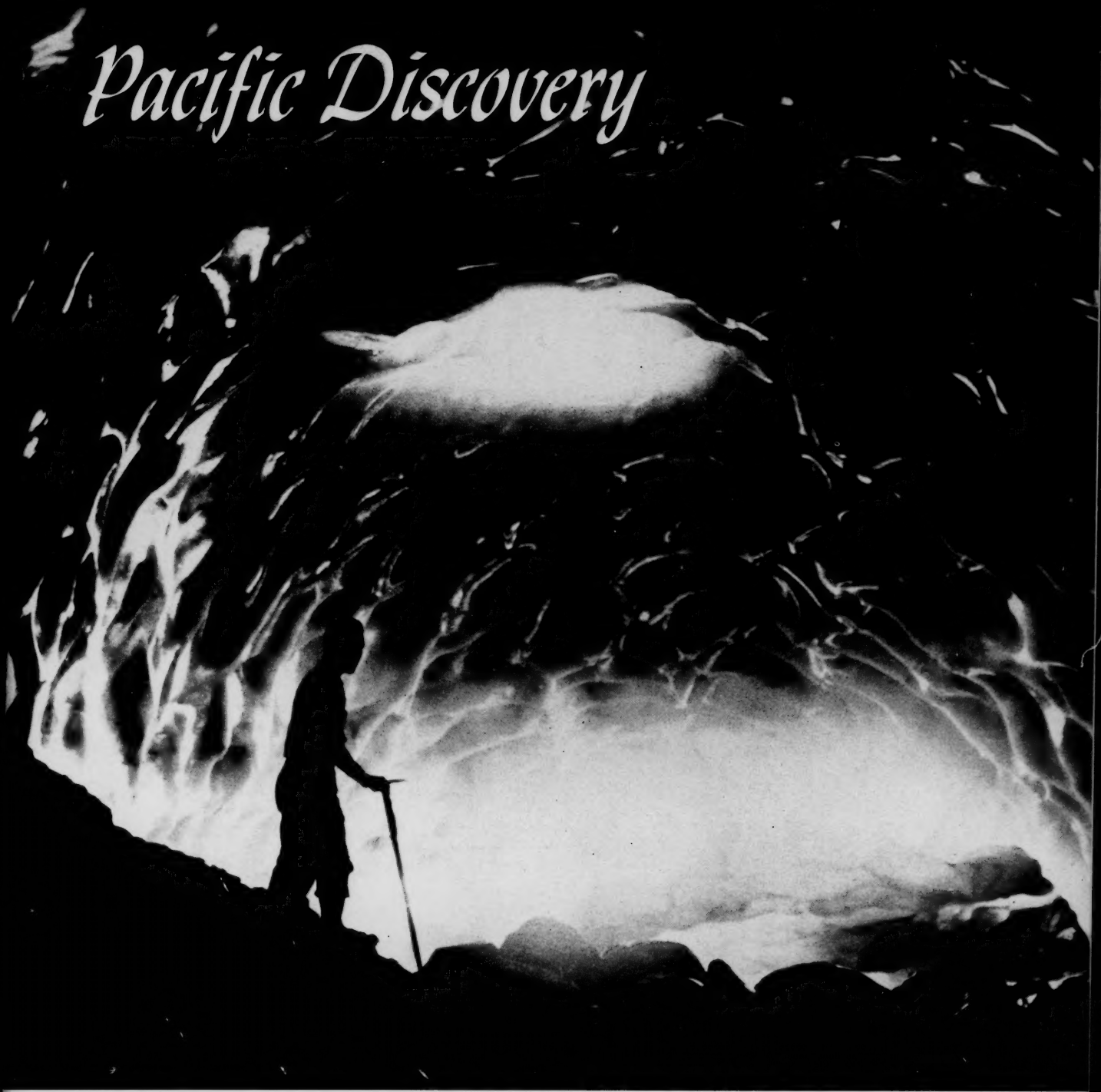
Pacific Discovery



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A JOURNAL OF NATURE AND MAN IN THE PACIFIC WORLD

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In This Issue

Pre-Discovery

Reverberations from Thunder River may be heard in the next issue if Philip ("Joe") Ferry returns from another inverted ascent—some unheard-of canyon in Utah, this time—he and Al Schmitz are making, in time to answer a letter from Charles P. ("Chuck") Valentine. Since Chuck writes with raised hackles—"I have been to Thunder River myself"—we feel that Joe should have a chance to take on his fellow Thunderer on the same platform. Jonreed Lauritzen please stand by. (Meanwhile, *PD* readers can enjoy Lauritzen's Thunder River article in the April 1950 *Arizona Highways*, with color.)

The *Seven Seas* will get to Cedros, dear Reader, never fear. Third and last chapter, which Woody Williams and Karl Kenyon call "The Turtle Hunters of Scammon Lagoon," stands in galleys down at the Press.

Discovering PD's Authors

Mount Rainier's new Park Naturalist, **Merlin K. Potts**, writes that the fate of "Mount Rainier's Greatest Ice Cavern" hangs in the balance of natural forces. "The recent glimpses of the Kautz Cavern we have had (with the 22-power scope from National Park Inn at Longmire) indicate a maze of crevasses broken through the surface snow and the ice above the cavern. It would appear that warmer temperatures and accelerated movement of the ice may well result in the collapse of the cavern, but who knows? It may be that we shall be able to get the photos you wish; at least we'll give it a try when conditions are favorable." Whatever the outcome, we hope to have the story in *PD*.

The vitality of a Sierran glacier or the temperature chart of a crestline snowbank are matters of grave concern not only to glaciologist **Oliver Kehrlein** but to every Californian. They are among the basic factors of the main water supply of most of the state's agriculture and the majority of its people. The author of "Death Comes to a Glacier" (not necessarily an obituary), who is editor of *California Safety News*, goes to the High Sierra every summer to investigate the health of our great watershed. His project this year, in coöperation with the Division of Water Resources of the State Department of Public Works, and the Geophysical Union, will be the exact measurement of snow evaporation and runoff above 12,000 feet. Results of the work, to be done on Bishop Creek, will help settle a standing controversy as to the ultimate importance of these two factors.

Among the recent war's luckiest overseas veterans are a few happy entomologists, zoölogists, botanists—eccentrics of one scientific stripe or another—for whom a GI stretch in Australia, New Guinea, or the "Philippine Isles of Enchantment" was dreams-come-true. Of course, these fellows like **Ken Stott, Jr.** were aware of the rain, mud, poisonous insects, snakes, plants, etc., ecto- and endoparasites, and other so-called disadvantages of the tropics; but such things were interesting phases of the natural scene, and the griping Joes who sat around pining for Podunk or Pittsburgh were just dull clods with no appreciation of the finer opportunities. But then the General Curator, Zoological Society of San Diego, is an old zoo man, having spent two-thirds of his life in Balboa Park—sacked peanuts and hawked pop at 10—except for four Navy years, during which he was enchanted by the Philippines. And that was not entirely time out from the zoo business for a naturalist whose chief interest is observing wild animals in order to do a better job of keeping and showing them in the zoo.

Benjamin Draper, who is spending a long summer in the ghost mining center of Georgetown, Colorado Rockies, enjoys mining the literature for interesting ghosts of Western history. If we call it natural history, "János Xántus—Naturalist and Fraud" is one of the most interesting 19th century shades who ever signed his name to other men's tales of discovery. This does not mean, however, that the poor little "Xanthus murrelet" Williams and Kenyon photographed on the *Seven Seas'* deck (*PD*, Jan.-Feb. 1950, p. 23) bears a stigma. The Hungarian plied a shady pen at home, his countrymen not suspecting an Háry János of exploration, but he was a prodigy among West Coast collectors, especially in Baja California, and had all kinds of critters named after him. D.G.K.

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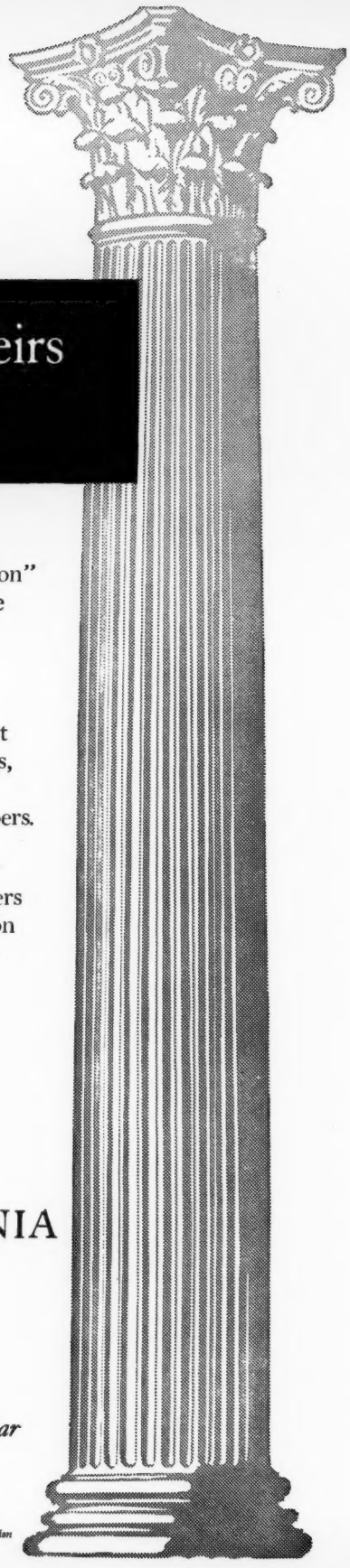

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EDITORIAL

Academic Freedom

As a springboard for this plunge we take a statement from a distinguished and worthy newspaper, the *San Francisco Chronicle,* under date of April 22, 1950:

"It's hard for anyone but a scholar to get his teeth into a principle like academic freedom, and it's hard even for an articulate scholar to make academic freedom and the principle of tenure crystal clear to the layman."

It is not the purpose of this piece to imply either that the writer is a scholar or that he is especially articulate, but instead to show that the principles of academic freedom and tenure are already crystal clear and can easily be understood by any layman, even an intelligent six-year-old child.

Education is as old as the human race, and indeed older. There is good evidence that animals, which for the most part get along by instinct and accidental conditioning, also acquire behavior patterns from their elders. Just as a random example, young canaries learn to sing better if kept with older, singing birds; and there is no doubt whatever that the higher apes learn by imitation, and even receive instruction from their parents.

Education has been given so many definitions that it would be beyond the scope of this editorial to enumerate them. For purposes of the present discussion we are going to define education as the process of learning from somebody else's experience. It is getting information the easy way instead of the hard way. The subject matter of contemporary education is the cumulative experience of the human race.

In a primitive society, education was the function of parents, or of the entire adult community. Children learned from their elders, by precept and example. Sons accompanied their fathers on the chase; mothers taught their daughters to cook, grind grain with mortar and pestle, sew animal skins, and keep the cave in order. As society grew more specialized, the situation changed. Little Joe could not so well accompany father to the shipyard, the mill, the counting house; and if he did he would learn only a small portion of the things he ought to know. The function of education, first of sons and latterly of daughters, has gradually but steadily been turned over to a small group—the teachers.

Teaching is an ancient and honorable profession. The word "master" was used as a term of respect for a teacher long before it became an academic degree, and the word "doctor" was applied to teachers before it was applied to physicians. Nevertheless, in spite of the high-sounding titles and the degree of genuine respect in which the teaching profession has always been held by considerable segments of the community, throughout recorded history teachers have had a recurrent and nearly constant struggle to maintain the conditions necessary for them properly to carry out the function society has assigned to them.

Now it seems axiomatic that education should be factual, realistic, unbiased. If a stone-age teacher were to tell his students that the way to deal with a sabre-toothed tiger is to approach it fearlessly, say "Nice kitty" and pat it on the head, he would clearly be incompetent and ought to be fired. But if he teaches that two stone axes and two stone axes are four stone axes, he should be protected in his right to teach even though the headman of the village or the entire village council thinks the answer is five. In other words, the teacher should be free to teach the truth, but not to promulgate error.

The problem is just as simple as that, but the solution is one toward which society has been groping uncertainly for a good deal more than twenty centuries. Who is going to decide what is truth and what is error? There, brothers, is—as Shakespeare would say—the rub!

We selected the statement that two and two are four as an example of an established fact because it is one of the few statements on which there has been substantially universal agreement since the beginning of recorded history. The body of knowledge is continually changing, and in most fields of learning not even the "elementary facts" have come through unscathed. What seems to one generation to be obvious truth may to another seem palpable error. If anyone doubts this, let him compare a current textbook of college physics with a textbook of "natural philosophy" published a century ago. Or let anyone past the age of fifty pick up a recent textbook of chemistry and compare it with the chemistry he learned in college! And let him reflect that in many other disciplines the flux has been equally great.

How then are we to determine what is the "correct" body of information to be transmitted to the youth in any generation? Clearly it cannot be determined by popular vote, nor can it be determined by deans, university presidents, or boards of regents, however able, public-spirited and well disposed. There is not a board of regents in the entire United States that is competent to decide, of its own knowledge, whether Albert Einstein should or should not be hired to teach theoretical physics. The only people in a position to decide

are his fellow physicists and mathematicians. His reputation as a scientist rests, not on the fact that his conclusions are self-evident to you and me (they aren't), but on the fact that he has convinced his peers.

Thus we come around to the curious but inescapable conclusion that the only people in a position to decide what should be taught are those who are doing the teaching. That is a thought quite likely to give one pause; but there is no alternative except to stop the wheels of progress and put the human mind into a strait jacket. Academic freedom is simply the right of the scholar to call his shots as he sees them.

Academic tenure, a much-misunderstood term, is only the reverse of the coin of academic freedom. It does not mean, as popularly supposed, that because a man is a professor he thinks he ought to be guaranteed a soft job for the rest of his life. It means that, having proved himself during a certain period of apprenticeship to be a competent scholar, he cannot thereafter be fired at the whim of a superior or because he points out some unpalatable fact. Without tenure a professor cannot really be free to pursue the truth; unless he be an unusually strong and forthright character, he will tend, even unconsciously, to cater to the views of his department head, his dean, his president, his board of regents, or to the mental attitude of the community; and he is likely to come at last to the intellectual impuissance of the country schoolmaster who, when asked by his school board whether he thought the world was round or flat, replied uneasily, "I can teach it either way."

It is true that academic freedom has occasionally, though rarely, been abused, and that academic tenure has sometimes, though still more rarely, been borrowed as a cloak by the lazy, the incompetent, or the subversive. There is no privilege that cannot be abused. The simple and priceless privilege of American citizenship, and the "due process" of our American courts of justice, have been far more wickedly and flagrantly exploited by subversive elements than the principles of academic freedom and tenure, hard won and still insecurely held.

To understand the struggle for academic freedom we have to go back at least to 399 B.C., when a teacher named Socrates was accused by the Athenian state. Socrates had a number of students, most of whom would get along all right in a modern university, and some of whom might get Guggenheim Fellowships, for example, Plato and Xenophon. But he had a couple of other students, Critias and Alcibiades, who turned out to be political hotheads; and who do you suppose got blamed for that?

Socrates was haled into court on charges of "atheism" and "corrupting the youth." These charges sound startlingly modern, and the casual reader would be likely to assume that he was a Communist. But on the contrary Socrates wasn't even a Jeffersonian Democrat; he was a Republican, whether by ancient or modern standards. However, when one is accused of a crime for political reasons, it makes little difference whether or not the charges are true. And those who today are so energetically throwing the term "subversive" in all directions might well be advised that a sword cuts both ways.

Socrates, before the court, defended himself with vigor and spirit, if not precisely tact. When asked what penalty he thought should be inflicted for his teachings, he suggested that perhaps he ought to be granted a life income by the state. This, as you might guess, burned the judges practically to cinders. The upshot was that he was condemned and sentenced to drink the hemlock. Of his death it has been written (in the *Phaedo* of Plato):

"I could hardly believe that I was present at the death of a friend, and therefore I did not pity him . . . he died so fearlessly, and his words and bearing were so noble and gracious that to me he appeared blessed . . . Such was the end . . . of our friend; concerning whom I may truly say, that of all the men of his time whom I have known, he was the wisest and justest and best."

It is no mere accident that men who have died for freedom have rather generally had a good press. There is something in that kind of courage that appeals to the commonality of mankind. "Deep calleth unto deep," and there is that within us that responds. To aspire to freedom is as natural as to breathe, and those individuals or peoples who do not know the urge to freedom are merely robots, not even half alive.

Academic freedom is not a special, limited prerogative that men of learning claim for themselves and would deny to others. In struggling to achieve and defend it they struggle on behalf of all men. For academic freedom is but one of those broad vistas of freedom of the human mind and spirit envisioned by the Greatest Teacher when he said, "Ye shall know the truth, and the truth shall make you free."

R.C.M.

Like the prick of a candleholder in a white-frosted birthday cake, the Kautz Ice Cavern on the slope of Mt. Rainier is plainly visible from Ricksecker Point on the Paradise Highway—airline distance approximately three miles.

MERLIN K. POTTS

Mount Rainier's Greatest Ice Cavern

Photographs by the Author

SOMEWHERE AHEAD, BEYOND THE CREST of the volcanic rubble of the ridge we followed, was our party's goal—the recently discovered cavern in the ice of the Kautz Glacier.

To the south lay the smoke-filled valleys and serrated ridges of the Cascades, crowned by the glistening summits of Adams, St. Helens, and, away on the hazy horizon, Hood; at our feet yawned the great chasm of the upper Kautz Canyon; and to the right, thrusting an ice-clad summit into the blue of an Indian Summer sky, rose mighty Mount Rainier. An inspiring panorama, it was a reward well worth the climb that had progressed through dense forests, across alpine parks, and finally left behind the last dwarfed and scattered outposts of the forest line.

Not many others had passed this way. Almost a century ago, in July 1857, Lieutenant August Valentine Kautz and his Indian guide Wapowety had led their party over this section in the first recorded, and unsuccessful, attempt to reach the summit. More recently, searchers for the ill-fated Marine plane which met disaster on the mountain in 1946 passed over the area. As the winter snows

disappeared from the southern slopes last summer the opening of a great cave appeared in the Kautz. To investigate this phenomenon was our purpose.

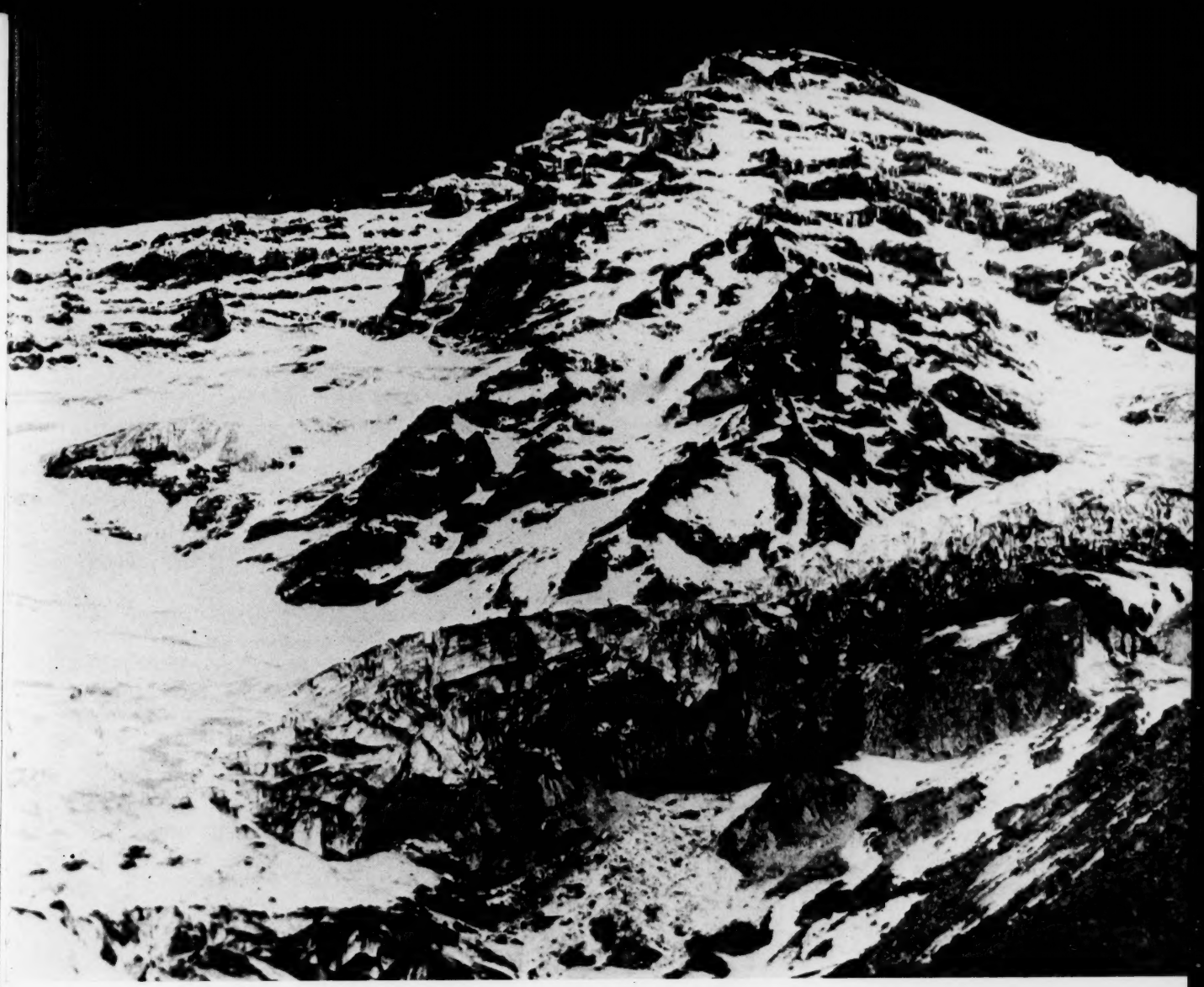
The so-called "ice caves" which develop from time to time in glacial ice masses have fascinated students of geology as well as the casual observer. Usually such openings form at the point of emergence of the stream flowing from the glacier's terminus, and are most extensive beneath an ice field which is stationary, or at most moves only a little. The Paradise Ice Cave of the Paradise Glacier is a well-known example, heretofore considered the largest of the caverns found on Mount Rainier. Caves developed at the termini of active glaciers are smaller, concave pockets formed in the ice mass above the stream. Such cavities do not often persist from year to year, but collapse at frequent intervals because of the melting and movement of the ice. The weight of the mass above, the degree of inclination of the slope, and the forces of gravity combine to make an active glacier into a river of ice which, because of its constant downward flow, makes the formation of a large and enduring opening impossible.

Plans to explore the Kautz Ice Cavern were abandoned when observation of the site at close range was possible. Avalanche hazard from the ice wall above discouraged approach by the most feasible route along a snow-covered ledge. Deeply crevassed ice below the cave effectively barred an attempt from this direction. At some four hundred yards it was possible, however, to determine that the opening of the cavern measures approximately sixty feet from floor to ceiling, slightly more than that across. A vertical rock face forms the inner wall, over which the ice arches outward and down. The cave, entering the ice mass as it does from the side, is totally unlike the usual formation. Its length is undetermined, the depth hidden in the darkness of the interior.

Studies of glacial geology, at least those made on Mount Rainier, have thus far not taken into account any formation of this type. The absence of any mention of a similar phenomenon in the available writings on alpine glaciation is in itself testimony to the unique nature of the cavern. Quite possibly such caves exist elsewhere, but certainly they are far from commonplace in their occurrence.

It is difficult to visualize the conditions that have brought about the formation of an ice cavern as great as this. Perhaps the lower stratum of glacial ice, which in this instance forms the ceiling and outer wall of the cavern, is sufficiently rigid to form a self-sustaining arch, capable of supporting the weight of the more rapidly moving upper layers. Probably much smaller originally, the tunnel formed by the arch has been greatly enlarged by the circulation of warm air afforded entry by the collapse of ice over what is now the mouth of the cave. The radiation of heat from the exposed rock face has aided in development.

At any rate there can be little doubt that the cavern has existed for some time, to be disclosed only by the breaking up and melting of a portion of the ice along the rock face to the right of the opening. It may well be that the severe earthquake which shook the Northwest on April 13,



1949 and caused a series of ice avalanches on the mountain, aided in its exposure.

How long the formation will remain intact is, of course, problematical. The walls have been weakened by the collapse of the ice which formerly screened the mouth of the cave. The movement, melting, and breakup of the ice, now in progress, will bring about further deterioration. It is assumed that there will be a continuing decrease in the ice mass; climatic conditions have caused a steady recession in the glaciers of Mount Rainier—this is indicated by systematic surveys which were begun in 1918, and by earlier records dating back to 1857. The decrease in mass at the elevation of the cavern, approximately 7,200 feet, will be proportionately much less than that shown by recession figures at the lower elevations. The inevitable collapse of the ice along the line formed by the inner rock face will open a break across a part of the glacier at this point, with an ice fall thus created immediately above the present location of the cavern.

Although the feature appears to be in imminent danger of cave-in, it may persist and even enlarge over a period of several months, remaining for some time Mount Rainier's greatest ice cavern, probably the largest of such formations in the United States. END

ABOVE: *The mouth of the Kautz Ice Cavern appears to have been exposed by the collapse of ice formerly flowing over the rock face to the right.*
LEFT: *Below the cavern the ice is crevassed and broken by friction with the canyon wall and irregularities on the bed of the ice stream.*

DEATH COMES TO A GLACIER

OLIVER KEHRLEIN

SOME MOUNTAINEERS DEVELOP A SPECIAL AFFECTION for a particular mountain, but I have never heard of a glaciologist falling in love with a glacier. Glaciers just aren't lovable—they are frigid, ponderous, and streaked with dirt as they plod along destroying (but also creating) the scenery. Their most photogenic features are their uncertain séracs and unpredictable crevasses—attractive at a distance, but forbidding at close grips. As with most living things, their virility and attractiveness vanish as death approaches—I found this out last summer.

Although they follow natural laws in their origins, daily movements, and death, there is much we do not understand about them. Here is one question for which science would like an answer: "How can a feathery and evanescent little snowflake live for hundreds of years and become one of nature's most powerful forces of destruction?"

It was to solve this riddle that Agassiz, Huxley, and Tyndall dedicated their summers in the Alps, nearly a hundred years ago. It is to the solution of this same problem that Seligman is burying himself alive on a Swiss glacier, year after year. For the answer to this and related questions, Sharp, Washburn, and other American scientists, each year, give up their vacations to the hardships and privations of a camp on the bleak upper reaches of the Malaspina Glacier in Alaska.

For a long time I have envied these men and their opportunities of working on these great glaciers—rivers of ice, miles long and thousands of feet deep—seas of ice covering territories larger than some of our smaller states—with tributary glaciers cascading down from wondrous backdrops of 18,000- and 20,000-foot peaks. No longer do I envy these men, for last summer I saw a pocket-sized glacier, a dirty little patch of ice which, in its dying gasps, told me the story of its past four thousand years as a solitary glacier, and of the minor role it had played, as the spearhead of a glacial system, in the dramatic evolution of our Sierra during the previous million years. It came as an unexpected surprise, in a location where it was believed a glacier could not exist.

We were camped with the Sierra Club at 10,500 feet on Rock Creek, immediately west of Mt. Langley, the most southerly of the 14,000-foot peaks, labeled "Corcoran" on all but the latest maps. The High Sierra ends here, its ragged crestline rapidly dropping off into the rolling, unglaciated watersheds of the lower Kern River tributaries. We were so far south that the snow, usually found at this elevation, was lacking, and we were forced to pack it in on mules for our "ice box."

Active glaciation had ceased here at least thirty or forty thousand years ago and no live glaciers have ever been reported south of the Palisades, 42 miles to the north. So you can imagine our surprise, mental and vocal, when John Thomas Howell of the California Academy of Sciences announced that he had seen a light blue, milky lake and some hanging sheets of ice on the north face of near-by Mt. Pickering. The natural inference was that the ice might be a residual glacier with its runoff water containing glacial milk or *till*. It did not take much persuasion to change our preconceived ideas and to start us on an investigation. Little did we realize then what a thrill we were to get for our trouble.

As we packed our gear and food, arguments pro and con were advanced. The ice could be glacial or frozen melt water. But the milky lake could be nothing but glacial. This at least would have to be explained. The most frequently advanced argument was: "Glaciers can't exist this far south."

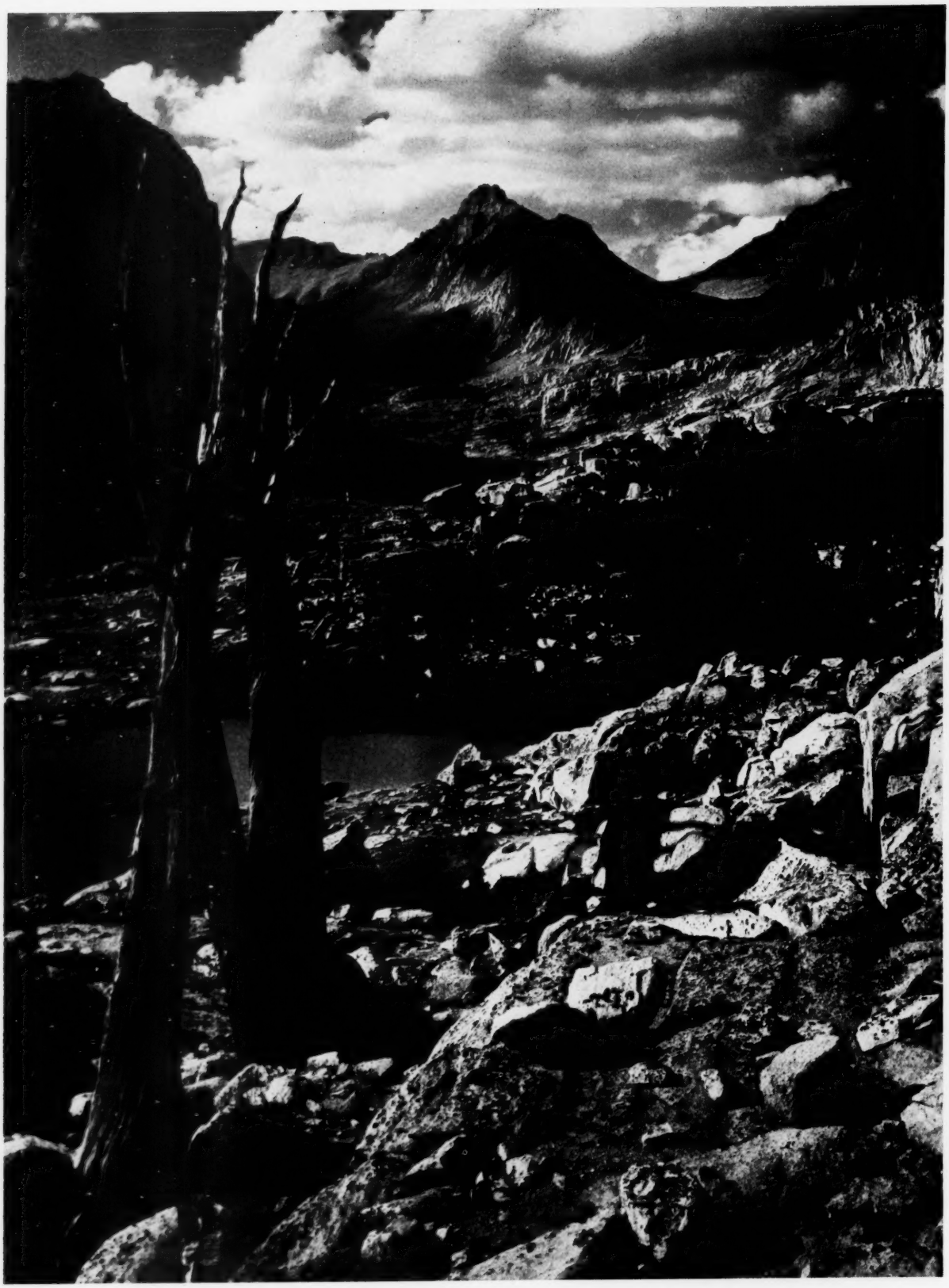
"Howell" Glacier is hidden
in its recessed amphitheater
under the ragged summit
of Mt. Pickering.
A million years ago
it gave birth to a mighty
glacial stream;
today it hangs to the cliffs,
a dying patch of ice.
(We do not propose that it
be named after its discoverer,
John Thomas Howell, curator
of botany in the California
Academy of Sciences—
it may not remain long on
the face of the earth;
moreover, the U.S. Board of
Geographic Names does not
approve the naming of a
topographic feature
after a living person.)
(James MacBride)

Finally someone answered that "Whitney had belabored John Muir nearly 80 years ago for having claimed a glacier on Merced Peak, using the same contention that 'the Sierra Nevada was too far south for glaciation.'" And Merced Peak was a hundred miles north of our camp. John Muir justified his claim by locating sixty more glaciers in the Sierra.

Then I tried unsuccessfully to answer this one: "How could Mt. Pickering, only 13,481 feet high, boast of a glacier when none of the eight 14,000-foot mountains and the scores of 13,000-foot peaks between here and the Palisades could support one?"

Next I thought of all the famous geologists and glaciologists, including King, Lawson, LeConte, Matthes, and Webb, who had fine-tooth-combed the Kern watershed and never reported a sign of recent glaciation. I knew a dozen men who had explored every nook and cranny of Miter Basin and had seen no evidence of live glaciers, not even a fresh moraine. True, none of them had visited that secret little basin north of Pickering.

We left camp early the next day, four of us—Miss Elizabeth Robinson, Alfred Whitney, my grandson Murrey Kehrlein, and myself. Entering Miter Basin by an old fishermen's trail, we crossed a series of disintegrated and overgrown morainal



mounds, hardly recognizable as glacial structures. The size of these moraines which clogged the entrance to Miter Basin was the first evidence we were to see of the might of the great ice stream that had once ended here. Previously, during the early Pleistocene, it had extended farther down into the Kern Canyon, leaving high lateral moraines along the walls of Rock Creek.

Our trail next crossed a lush meadow, the remains of a large lake long since silted in. It was this and similar meadows higher up that caused the pioneer cattlemen to call the Basin by the unattractive but practical name of Cow Heaven.

As we reached the head of Miter Basin, we allowed our imaginations to review in retrospect the past history of the valley and of the part our putative glacier played in its formation. Going back to the Eocene epoch at the beginning of the Cenozoic era, about 60,000,000 years ago, California rose gradually from the Pacific Coast to a series of rolling hills, the most easterly of which were to become our present Sierra Nevada.

Pine snags are stark witnesses of a warmer period when Miter Basin was more luxuriant than at present. In the center background stands a shoulder of Mt. McAdie separating the two early branches of Rock Creek. The branch to the right rose from near Mt. Mallory (on the skyline near the right edge of the picture) and flowed placidly down its nearly level valley for sixty million years. It can still be seen, suspended above the cliffs of Miter Basin very much as it was millions of years ago. The other branch broke through to the left of McAdie on a shoulder of Mt. Pickering. It originated high on the north face of the latter and circled in a series of tumultuous cataracts down into the main basin. Our search for the dying glacier followed up the cliffs and past the lakes left by the ancient glacier and the stream that succeeded it. (James MacBride)

These hills were low, rounded folds in the earth's crust, trending northwest and southeast, with shallow swales between. From one of these folds was evolved the southerly tip of the Sierra Crest, now eroded to a jagged series of pinnacles, among which are Mts. Mallory, LeConte, and Langley. From the next fold to the west was developed the Whitney, Muir, and Pickering group of peaks.

In the flat valley between the two ridges meandered a small stream, our present Rock Creek. Near its upper end this stream divided into two branches, one continuing directly north to Mallory, the other veering west to drain a depression north of Pickering. It is interesting to note how these two branches, starting from similar elevations (now about 13,000 feet) could differ so widely in the subsequent development of their courses. For 60,000,000 years the Mallory branch flowed gently southward along a flat, rounded valley and still continues to flow down that same valley, altered only slightly by the action of wind and frost. For a short while the glacier invaded the lower end of the valley but left only slight evidence of its destructive work. It is always awe-inspiring to visit these prehistoric valleys and to realize they have remained unchanged for millions of years while everything around them has yielded to the devastating forces of nature's relentless and destructive processes (see pages 16-17).

As for the Pickering branch, it has led a fast and tumultuous life. Its course was shorter but much steeper. Its rapid flowing waters, cutting through softer formations, proved far more ravaging. As the Sierra rose higher and higher with each geological uplift, the stream increased in size and power. Millions of storms came to help it in its disruptive work. A network of tributaries resulted, eroding the mountainside in every direction and honeycombing it with gullies and channels. By the time the Great Ice Age of the Pleistocene had arrived, a perfect setting had developed for a glacial amphitheater. Into this receptive catch basin, winter storms blew great quantities of snow from the southern slopes of Pickering and a destructive group of glaciers was formed. Of these the most destructive was the glacier lying against the north face of Pickering.

With rising temperatures and decreasing snowfalls, the Great Ice Age passed and these glaciers vanished. That is, they all disappeared with the possible exception of that lone remnant we were searching for, from which we wished to elicit the secret of its vitality.

Viewed from below, Pickering Basin impressed us as a labyrinth of gray granite—bleak, barren, and desolate. But as we climbed into its confusion of ledges and terraces, we were greeted by a colorful surprise at the top of each cliff. These cliffs can best be described as the risers of a giant flight of steps, technically called "glacial steps." Glacial steps are formed by hard granite dikes crossing the paths of ice streams and resisting the abrasive action of their ponderous weight. The color, blue

of every shade and hue, was supplied by a succession of rock-bound lakes nestled in deep basins carved from the softer rock behind the dikes.

On the first step we came suddenly upon Sky Blue Lake, reflecting the moods as well as the colors of the sky, from the soft pastels of dawn to the deep purples of the alpenglow. The unnamed lake on the next shelf could have been an inspiration to Maxfield Parrish—a mirror of indigo blue set in a classic oval frame. Its perfect symmetry and midnight coloring contrasted strangely with the shattered cliffs and pinnacles that surrounded it. We accepted readily the name suggested for it —Gentian Lake.

From here we veered sharply to the west, close to the north face of Mt. Pickering. Above the next dike we found a shallow jade-green tarn. Its inlet and upper shore were being taken over by a spongy meadow—nature's inexorable laws had already sealed its fate. On the meadow, fresh droppings told us that mountain sheep were finding here a good feeding ground.

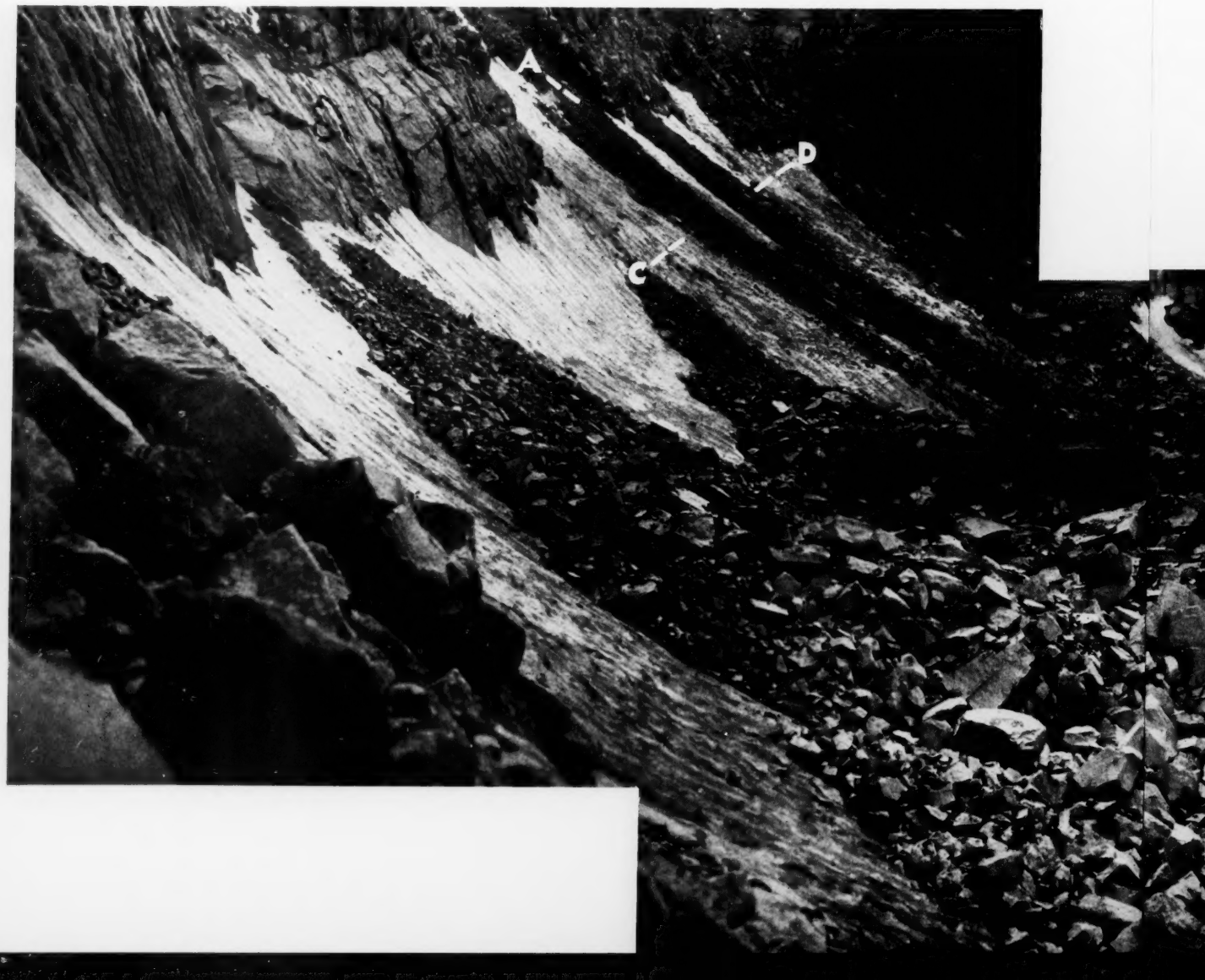
From there on, developments came thick, fast —and exciting.

At the 12,800-foot contour we came upon a terminal moraine of relatively recent formation, perhaps two or three thousand years old. Unquestionably we were nearing our goal as it was the only moraine of this type we had seen in the Rock Creek watershed. I paused to study its formation and contents, while the others pushed on and over it.

Suddenly came the long awaited announcement—

"Oliver, here's your light blue lake!"

Forsaking the moraine for the moment, I followed them to a small lake. It was divided by a submerged dike into two bays, the lower light green, the upper baby blue and milky. There was absolutely no doubt the upper section contained



suspended glacial till. We stirred it and dipped the water in our hands. Howell was right.

Excitedly we searched for our glacier. Farther to the west, in the depths of the elongated amphitheater and 300 feet higher up, we saw banks of ice. They were plastered against the side of the mountain, 300 feet below its summit.

Hurriedly we worked our way along the narrow and half-buried stream bed, over and under great talus blocks and around fanned-out slides of loose rocky debris. The stream ended abruptly at the foot of a sloping wall of unstable boulders. We could hear the flowing water beneath the rocks. This was undoubtedly the terminal moraine and our glacier was directly above.

We circled around to the left and onto more stable rocks—that is, comparatively stable, as even these shifted dangerously as we climbed. Each time we stopped to catch our breath (we were over 13,000 feet and the excitement and exertion were telling on us) I examined the adjoining irregular mass of morainal material. It showed three well developed terraces, each indicating a period of major glacial activity. As most of our other Sierran glacial moraines showed four or more of these terraces, I suspected there must be a fourth and began searching for it.

Then, during one of our breathing rests, I glanced back at the light blue lake and again noticed the fresh moraine below it. Then I realized that our glacier, during its first thousand years of activity, had extended down into the valley and there had carved out the lake basin and built up that large terminal moraine. This lower and fourth moraine was made up of the material which had accumulated during the interim between the Great Ice Age and our own Little Ice Age, a period of over 5,000 years. The whole mass had been carried down by the ice during its first surge of activity.

As I saw the complete picture, I then understood the reason for a similar morainal structure below Mills Glacier in the Fourth Mono Recess. There the terminal likewise had only three terraces and a long winding morainal tongue which extended down the valley and cut a glacial lake into two parts.

We finally reached the glacier and, frankly, our first view was disappointing. It was less attractive than the near-by banks of snow and apron ice. Yet it had all the essential characteristics of a glacier. It certainly was small—the smallest glacier I had ever seen, approximately 450 feet from side to side and 300 feet from terminal moraine to headwall.

It was littered with detritus fallen from the mountain, increasing in quantity toward the lower end, where there was more rock than ice. Its surface at the terminus had withered and dropped to eight feet below the level of the terminal moraine. However, it is possible that the ice extended into and infiltrated this rocky mass. This possibility took on significance as we later considered the milk in the runoff water. Its lateral moraines extended up both sides of the ice for a couple of hundred feet and then petered out.

Its horizontal contours were slightly concave, possibly because of its depleted condition. In a healthy live glacier they are convex. Its vertical curves were typical, though less pronounced than

In profile, "Howell" Glacier is not a thing of classic beauty. Lying on the north face of Mt. Pickering, most southerly of the 13,000-foot peaks on the Sierra Crest, this dying glacier measures 300 feet from headwall (A)—where a narrow crevasse indicates possible movement downward—to snout (B), and 450 feet across (C to D). Rock detritus dirties its surface. The jumble of boulders to the right is the latest terminal moraine. "Apron" ice in the left foreground is frozen runoff water. (Photograph by the author)

usual. At the headwall, the ice hung at a steep angle for its upper third, leveling off slightly to the first of the annual rings. There it became more abrupt as it dropped across the face of these laminations. Though these rings were not very distinct, we were able to count 17 of them. In the lower third, the surface leveled out again toward the terminal snout. In these attributes it resembled our other small, hanging Sierra glaciers.

Two features were lacking, however—two features which would indicate positively that this accumulation of ice was a living, moving glacier. First, it lacked that soft fresh snow—*firn* snow—at its upper end. This is the reservoir, the source of supply which feeds and maintains the life of the flowing stream of ice. Second, it lacked a *bergschrund* or crack at its upper edge to indicate the downward shift of the mass of ice from its headwall. In its place was a small six-inch crack hardly large enough to suggest movement.

There was no doubt in my mind that this was or had been a glacier. If it was still alive, how much life did it have? Was its semi-fluid, compacted snow still moving down the mountainside?

Glaciologists recognize two forms of motion in glaciers: one, the sliding of the whole mass as a unit down its glacial bed; two, the plastic or viscous movement of portions of the ice, flowing over or past other portions—such as we find in spreading tar or molasses. A live glacier would do both, while a dead one could only slide as a solid mass.

As we stood there shivering in the cooling shadow of Mt. Pickering's shattered summit, I felt very much like the doctor who had arrived at the death bed just in time to witness the patient's dying gasps; or perhaps like the autopsy surgeon, dissecting the corpse to find the cause of death. So for diagnostic purposes I asked the following questions:

(1) Is it still alive? Is the snow accumulating at the *névé*— the fountainhead—above and flowing viscously downward to be dissipated at the snout?

(2) If it is dead or stagnant, how long since the motion has stopped?

(3) Alive or dead, how could a glacier persist on Mt. Pickering (our most southerly 13,000-foot peak) when there are no others along the crest for nearly 40 miles? (In this stretch there are eight 14,000-foot mountains and scores of 13,000-foot peaks.)

In answer to the first question, the evidence suggests that the body of the glacier has died, but that the center section may still show a spark of life.

Life, i.e., motion, is indicated in a dying glacier by the presence of such features as crevasses, a bergschrund, and suspended till in the runoff waters. There was no evidence of crevasses. As for the bergschrund, we could hardly admit that the thin six-inch crack at the upper margin could take its place or function. A bergschrund is formed when the annual supply of fresh snow on the upper portion of the glacier settles, compacts, and slides down and away from its headwall. In the small Sierra glaciers, the gaping bergschrund usually measures about six feet across. The presence of this narrow crack at the head of the glacier can be explained as resulting from: (1) heat radiation from its rocky headwall; (2) natural shrinkage; (3) sliding of the glacier as a whole.

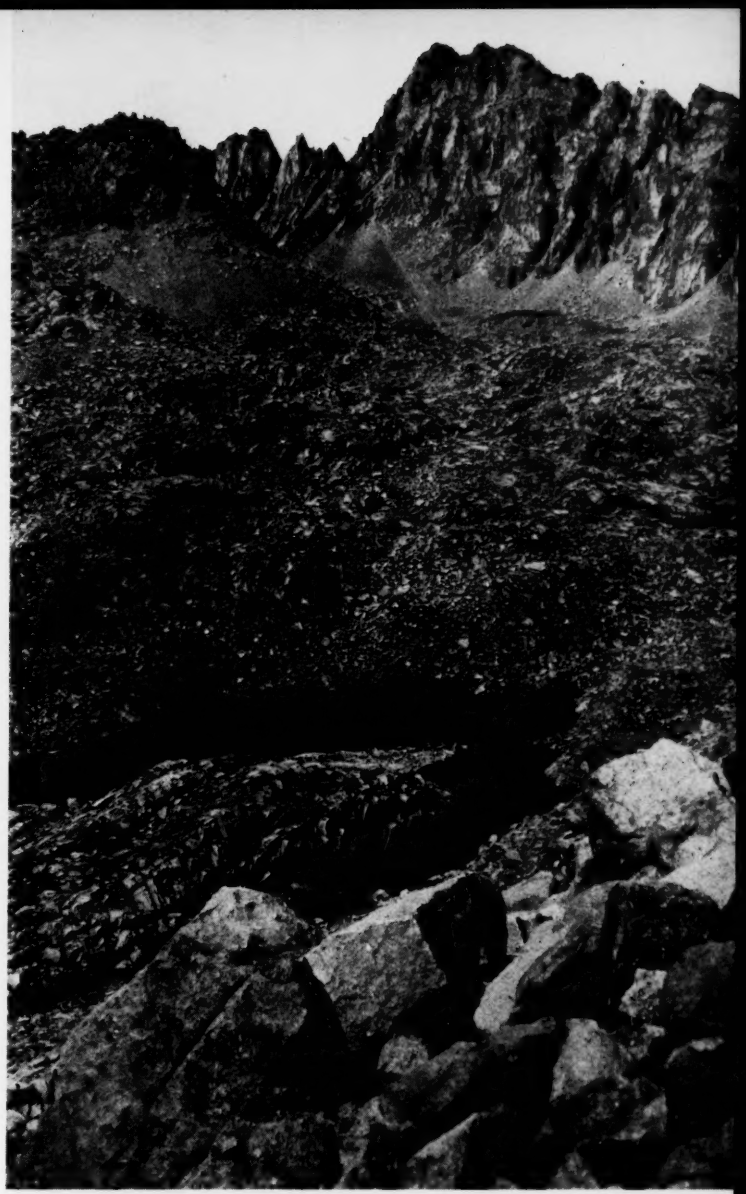
The most important indication of stagnation in the glacier was the lack of loose *firn* snow in the névé. With no new snow accumulating in the reservoir, the preceding layers are not being compressed and forced downward. The cycle is broken and the ice stream ceases to flow. It may be possible, however, that in the middle portion of the glacier there could be some overriding of the upper layers of the other annual rings.

This slight localized movement could account for the suspended till in the water below. This glacial milk might also come from till impounded in the melting ice, either from the glacier or from within the terminal moraine. It might also be the result of a sudden storm picking up till from deposits left among the rocks in or below the moraines.

The above evidence suggests that the death of the glacier has been recent—recent enough for us to hazard an approximate date when the overall movement of the ice ceased. Fortunately the glacier itself gives us a clue to this date.

The 17 rings in the center of the ice indicated 17 years of snowfall which had been compressed and forced down to this position by the weight of the snow above. If we could determine when this snow fell and how long it took to travel to its present location, then we could fix the date when the glacier stopped moving—i.e., when it died.

Checking our tables, we found that annual snowfall between 1890 and 1907 had been above average. Those 17 years of heavy snowfall were most probably the same that produced the 17 laminations. Since that time, the snowfall has been



The polished walls of this rock-bound valley (viewed from the slope below "Howell" Glacier) give evidence of the turbulent cataracts of ice which flowed through here for a million years. During our present ice age the glacier excavated the small catch basins now containing telltale light blue water. The fresh morainal mounds in the center foreground place the time of the accumulation at four thousand years ago. On the skyline stands Mt. McAdie (13,801 feet), named after San Francisco's famous weather man. (Photograph by the author)

below normal and this might account for the final slowing up of the ice flow.

The distance from the highest annual ring to the upper edge is 120 feet and the time it took the ice to travel that distance could be computed from the following data. Using the width of the usual bergschrund on similar glaciers, we can estimate that the snow in the upper section drops about six feet the first year. Since then the motion has stopped, so we can assume an average speed of three feet a year. Thus it would take approximately 40 years, at this speed, for the snow in the upper annual ring to travel 120 feet. So if our mathematics are correct and our other conclusions are not too far amiss, the motion stopped and our glacier died only a couple of years ago. Judging from the appearance of the ice, I would conclude that this is correct.

The solution to the last question is also a mathematical one—subject, however, to certain variables which might change the answer slightly. How can a peak, as far south and as low as Mt. Pickering (13,481 feet) support a glacier when higher peaks to the north do not?

As a basis for our calculations, let us consider the elevation at which glaciation takes place along the length of the Sierra. The lower limit of glaciation is determined by the elevation at which the ice in the snout melts (dissipates). This elevation of dissipation rises with each mile we travel south. The crucial contour for our most northerly glaciers along the Sawtooth Ridge (in Yosemite National Park) lies at 10,800 feet. For the North Palisades Glacier, 76 miles farther south, it is 12,300–1,500 feet higher. Thus the rate of increase in elevation is about 20 feet per mile.

Mt. Pickering is 42 miles south of North Palisade and its elevation of dissipation therefore should be 840 feet higher, or at the 13,140-foot contour. Since our glacier is situated 300 feet below the summit of Mt. Pickering (13,481 feet), it is physically possible for this mountain to support glaciation.

The height of a mountain is not the determining factor for glaciation, but rather the elevation of the lower end of its glacial bed, where the snow

Photograph by Robert Granger

"It is always awe-inspiring to visit these prehistoric valleys and to realize they have remained unchanged for millions of years . . ."

A sea of ice passed this way, grinding, leveling, and polishing the gray granite to form a broad and peaceful basin. From its upper recesses thundering falls of ice cascaded over glacial steps to leave behind rich color in deep blue lakes on each succeeding tread.

Shoulder of Mt. Pickering

Spur of Mt. Newcomb

Mt. Muir

↑ *Mt. Muir and Whitney Crest* ↑ *Mt. McAdie* ↑ *The Miter*

will be dissipated. This explains why the mountains between Pickering and the Palisades have no glaciers. During the Pleistocene, these mountains were all heavily glaciated and their aggressive glaciers gouged out large and deep amphitheaters with high, steep headwalls. Frost action has since deepened these amphitheaters and steepened their headwalls until now the base of these cliffs lies below 13,000 feet and the elevation of dissipation. Another factor against glaciation on these peaks is that their glacial cirques face east, which is not as propitious as when they face north as they do on Mt. Pickering and on the Palisades group.

Incidentally, a "glacieret" has been reported in a notch just south of Mt. Whitney's summit, but this has not been confirmed. Also, an incipient (or shall we say moribund?) glacier has been reported on the north face of Table Mountain at about 12,900 feet. Weldon Heald suggests the possibility of glaciation on the north face of Black Kaweah. All of these lie just north of Mt. Pickering and deserve investigation.

Two additional factors favor glaciation on Mt. Pickering: one, its glacial amphitheater lies in a narrow cul-de-sac, thus providing exceptional sun and wind shadows, both of which retard dissipation; two, this deep recess forms an excellent catch basin for wind-blown snows from winter accumulations on the expansive terrain to the south of the mountain.

If it comes to pass that the present drought continues, as our meteorologists prophesy, then this little body of ice probably will vanish completely. If, however, the cycle changes toward increasing cold and precipitation, then our glacier may take on new life and reactivate itself. Meanwhile our little patch of ice can prove of great value. Located at a point where slight variations in temperature and precipitation could result in appreciable fluctuations, it might serve as a natural weather vane and as a long range indicator of our climatic cycles.

It had been our intention to suggest that this glacier be named after Mr. John Thomas Howell, botanist and curator for the California Academy of Sciences, who called it to our attention and who has done so much for the natural sciences in the Sierra Nevada. On second thought, we question the appropriateness of naming a dying thing after such a live person. I am afraid my face would be quite red if the suggestion were accepted—and then the glacier disappeared completely! END

Philippine Is

The 7,083 volcanic and coral Philippine Islands lie midway between the Equator and the Tropic of Cancer. With a north-south reach of 1,150 miles they would, if placed over our three Pacific Coast states, stretch from British Columbia to Baja California. They total 114,400 square miles (Arizona has 113,956). Luzon, largest island, has 40,814 square miles (216 more than Kentucky). The very much mixed population numbered around sixteen million in 1940.

Isles of Enchantment

KEN STOTT, Jr.

We saw this red-sailed barca at Samar. (W. W. Taylor)

IT TOOK THE PHILIPPINE ISLANDS to convince me that nature does not always follow well ordered patterns. In that strange archipelago nothing seems to behave as it should. Fish flop nonchalantly out of the water to bask on sunny rocks and logs. There are lizards which have wing-like membranes and glide from tree to tree; there are lizards which bark in shrill voices. Plants send up enormous flower-stalks and burst into bloom overnight. Such things are most disconcerting and a little confusing to the uninitiated. From my point of view, these tropical isles of the western Pacific might better have been named the "Islands of Paradox."

Our first view of the Philippines came in a blaze of glory. The mists broke suddenly and there before us, bathed in the coppery rays of a newly risen sun, lay the green slopes of Leyte and Samar.

Once within the Gulf of Leyte, the transport on which we rode turned north to parallel Leyte's shore line. In passing we could clearly see one little coastal village after another. *Barcas* with gaily colored sails bobbed at their moorings and extensive fish traps reached out toward us from the beach. On our right lay Homohoni, the islet where Magellan first set foot on Philippine soil more than four hundred years ago.

Ahead Samar, third largest of the Philippine Islands, came closer and closer until at last the mighty screws of the transport came to a stop. In no time we were aboard a landing-craft and plunging towards the palm-lined beach. Even as the prow hit the beach with a thud, a truck rolled up beside it.

We drove inland over a bumpy roadbed of coconut logs laid side by side. Brown-skinned children with tousled black hair waved as we passed them on the road and sloe-eyed, betel-chewing women smiled covertly up at us.

Leaving the marshes, we entered the town of Guiuan, a sprawling community of more than 12,000 inhabitants. Rising conspicuously above its roof-tops was a church with a thick, mossy bell tower. We later learned that the structure had been built in 1555 by Augustinian friars. Known as the Church of the Immaculate Conception, this majestic building had served as a refuge during countless floods and typhoons, and as a fortress during the devastating attacks of the Moros.

We were driven through Guiuan rapidly and into the coconut palm forests beyond to a trim naval base that differed little from temporary

bases within the United States. There we were billeted in a quonset hut and received our first instructions. We were informed that the Guiuan base was not to be our permanent station; that it was merely a center for personnel distribution. the seven-man epidemiology unit I belonged to was to remain there to await further orders and our gear was not to be unpacked. We were to devote the interim to field survey work and practice investigations in the surrounding area.

history work. Two were entomologists and three were parasitologists. Dr. William Stewart, the M.D. in charge of the unit, had been affiliated with both the Philadelphia and the San Diego zoos, and I had been associated with the latter institution for several years. To each of us, our wanderings through Philippine jungles constituted a rare opportunity, a chance to see alive and in their native habitat creatures we had known previously only in books or through museum specimens.

The shoreline of southern Samar is winding and low-lying. (W. W. Taylor)

We spent three months in Guiuan, three months during which we explored every highway and byway. It is difficult to imagine any means by which we could have become better acquainted with this wonderful land than through the medium of epidemiology. This phase of medical science, as its name indicates, deals with the study of epidemic diseases. It involves a maximum of field work, and every natural aspect of the country in which it is conducted must be investigated.

Before the war years, each member of our team had been engaged in some form of natural

Our first trip into the interior was short. Yet in a way it was more impressive than any of its successors, for everything we encountered that morning was new and strange to us. We started this initial "exploration" trip by selecting at random one of the narrow paths which began at the edge of the camp clearing.

Matted undergrowth lined the path and from it protruded the lacy fronds of tree ferns and the gnarled trunks of ebony trees. Despite the density of the vegetation, there was a profusion of highly colored blossoms.

Torch ginger and crimson hibisci stood out conspicuously against a background of greenery. Orchid plants grew on every tree trunk, in some cases so close together that the trunk was completely obscured. Few of them bore flowers which compared in size with orchids of commerce, but many were even more gaudily colored. One rather plain little orchid compensated for its drabness by exuding a heavy and delightful aroma resembling that of gardenias.

A strident shriek over our heads caused us to look up. There, on a branch not more than 25 feet above us, sat a cockatoo which raised and lowered his crest with each indignant scream. His satiny white plumage and blood-colored vent seemed incongruous in this land of verdancy, and it rendered him anything but inconspicuous. When weary of the mutual examination, he flew off screaming at the top of his lungs, and from the surrounding treetops other cockatoos burst into flight to join him.

The cockatoo clan reaches its high point in abundance and diversity in the Australian region. But in the Philippines there is only a single form, and it serves to indicate a faunal affinity with the Australasian region. Other parrots we encountered that morning completed the picture, for they represented types which are typical of the Malayan region—heavy-billed, blue-naped parrots, and little hanging parrots which when resting suspended themselves bat-fashion from the branches. Thus we had concrete examples to confirm what we had previously read—that the Philippines lie in an intermediate zone which is inhabited by animals and plants of the regions on each side.

With the exception of the cockatoos, all of the parrots we found in the Philippines were quiet, shy little things. Unlike the Amazons and others among New World parrots, these fed silently and even when frightened made little or no sound.

Not all of the birds were so retiring, however. Some chattered and screamed until our ears rang. Rose-wattled mynahs or, as the natives call them, *coletos,* followed us everywhere and examined us with a curiosity which equaled our own. Their high-pitched calls served as ample warning to other feathered and furred creatures that intruders were near. Orioles, golden-bodied and red-billed, bugled from the treetops, and coucals, large ground-dwelling cuckoos, hooted from bamboo thickets.

Once as we rounded a bend in the path, a heavy, chicken-like creature rose from the ground and flew low with rapid wing-beats into a tangled mass of rattan. It was visible for only a few seconds, just long enough for us to identify it as a megapode, or mound-builder, a creature noted for its remarkable nesting habits. It deposits its eggs in a heap of rotting vegetation, at which point it considers its parental obligations fulfilled. While the giddy hen wanders off into the forest, the eggs are incubated by heat generated by the decomposing pile of leaves. Eventually the eggs hatch and the babies push their way unaided from the rubble. Fortunately, these infants are so well developed upon hatching that they are usually able

The inevitable pig of the Malaysian countries scavenges the streets of Guiuan in southern Samar. (For a near-duplicate of this scene, but in Sumatra, see PD, *July-August 1948, page 7.)*
(A. Peterson)

to survive infancy even without the protection of their parents. As soon as their feathers are dry, they are quite able to fly.

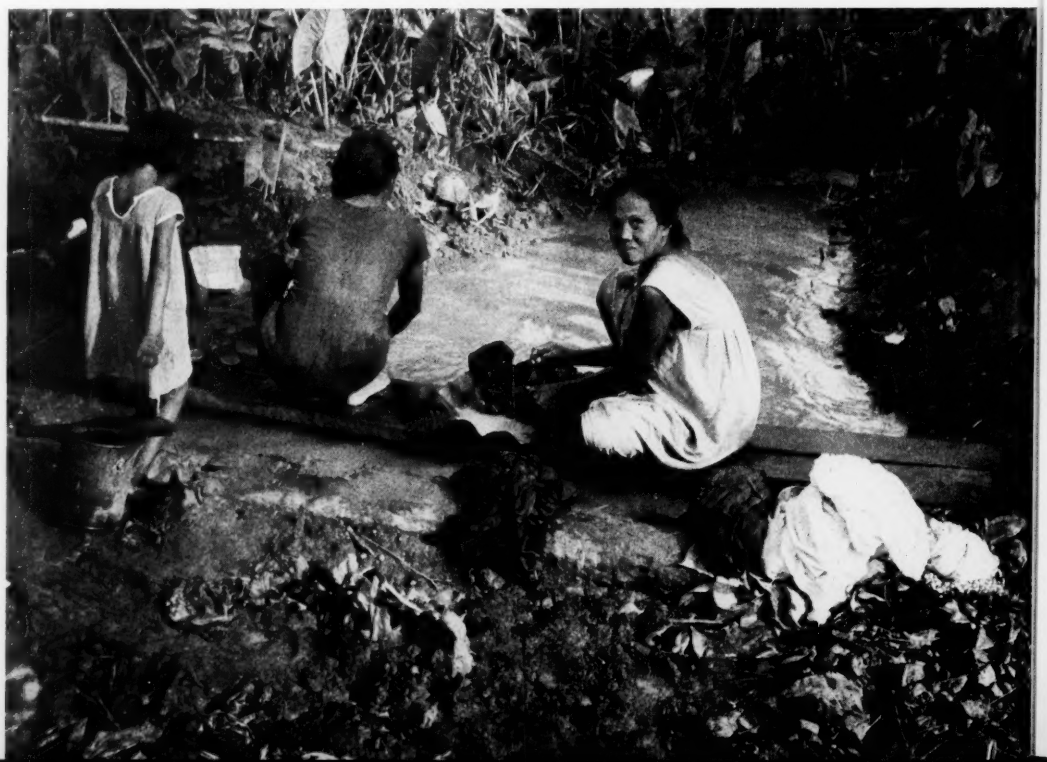
We were still discussing the eccentricities of the mound-builder when a man appeared before us in the path. He was typical of the Visayans—small, wiry and stooped. He was dressed in cast-off army shorts and shirt, and a ragged straw hat. His feet and legs were bare, yet he seemed unaware of the thorny nature of the vegetation he brushed against as he walked along the trail. His legs bore numerous scars as well as several open lesions which we assumed were due either to tropical ulcers or yaws, or perhaps to a combination of both. As he approached, he grinned broadly, exposing two uneven rows of betel-stained teeth.

When he greeted us with a cheerful "*Sankay!*" we began a friendly conversation which was conducted mainly through the medium of gesticulation. When somehow we managed to convey the idea that we were interested in wildlife, he proceeded to point out what he considered the unique features of his domain. He pulled aside rotting logs to expose centipedes the size of fountain pens. He pointed out columns of inch-long ants as they passed unswerving through the forest denuding everything which lay within their path. Like the majority of Filipinos we were later to meet, he was only too anxious to entertain us.

Aside from the forest trips, those to the broad coral reef which bordered the eastern shore of Samar were undoubtedly the most interesting. There we scooped jewel-like fish from the tide pools and watched venomous sea snakes swimming through the water. Filipino fishermen, who dove into the deeper pools and speared fish, were always glad to have us examine and sketch or photograph their catches. Despite the handsome coloring which characterized most of the reef fish, the one by which we were most intrigued was a plain, mottled little creature which brought to mind a tadpole. Its distinction lay not in its appearance but in its habits. Defying the best established of fish traditions, it often left the water to slither awkwardly onto an exposed piece of coral, a fallen coconut log, or even up on the sand of the beach to bask in the sun. But when disturbed, it was off like a shot for the water, bouncing along the ground in a manner which has earned it the name of mud-skipper. We frequently carried mud-skippers back to our quonset-hut museum. They were easily transported, for they fitted nicely into an envelope or a pocket.

While the surrounding country never ceased to fascinate us, the town of Guiuan boasted an appeal of its own. Owing to the concentration of servicemen in the area, it had become well Americanized and its inhabitants were making the best of the opportunity to sell poorly made and stereotyped curios. Signs boasted of "Souvenirs Cheap" and "Haircuts and Shaves." Sidewalk barkers proclaimed the superiority of Maria's linen scarfs or of Concepcion's shell necklaces.

Even the cock-fight arenas bore evidence of the Americanization process. "Cold" drinks were sold in the stands and woven mats were rented to mod-



These Visayan ladies of Samar are using the world's oldest and commonest type of laundromat. Notice the wash basin with fluted edges. (W. W. Taylor)

Late afternoon on Samar—the fishing fleet beaches with its catch. (W. W. Taylor)

erate the degree of discomfort inflicted by the hard and uneven benches. The fights themselves, however, were strictly Filipino. This national pastime is too well liked in its original form to be modified by the customs of foreigners.

The betting before each fight is feverish and prolonged. Both of the contestants are held high in the air so that the crowd may examine them, and the finer qualities of each are indicated. The money begins to dribble in, but the fight itself does not begin until a sufficient sum has been placed on both contestants. If the betting is too one-sided, the owner of the less popular contestant clutches his bird to his breast and marches off in disgust, hurling invectives at an audience which obviously has no sense of values.

If, however, the betting is more or less even, the two birds are eventually taken to opposite sides of the arena and spurs of steel are tied to their legs by leather thongs. This is a slow and tedious process and is often done over and over again until the owner is satisfied that the spurs are properly attached.

Then, to a thunderous shout, the fight begins. The spectators rise as one to their feet, with the result that from this point on only those in the first row have the faintest idea of what is happening. Those in the back may see no more than a flutter of wings for their money. The fights are short, seldom lasting more than a few seconds—just long enough for one of the birds to deal a slashing and perhaps fatal blow to his opponent. The winning bird is held up to receive an ovation and the loser is carried off to provide an evening meal for its owner.

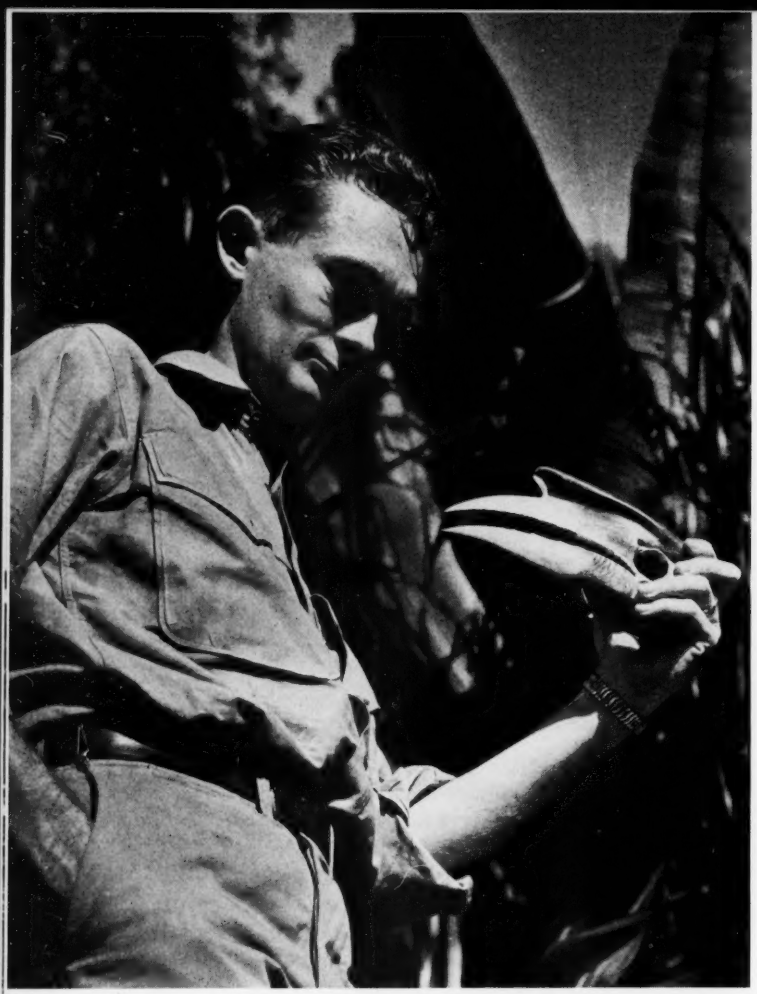
Although we had spent three months awaiting them, our orders came as a surprise, and it was nothing short of a miracle that we managed to get our equipment and private gear organized in time to make our plane. The dispatch read, "Proceed by air to Zamboanga, Mindanao."

Zamboanga! The word itself held an aura of mystery. We had previously read enough about that city and the island of Mindanao to know that we were headed for one of the wildest regions in the Philippines—the stronghold of the truculent Moros.

We left Guiuan at daybreak. The plane rose from the runway into a sky filled with billowy pink clouds and Samar fell behind. Leyte passed beneath us and, after it, Bohol, Mactan, Cebu, and the southern tip of Negros.

According to our map we were now not far from Mindanao and the word "unexplored," sprinkled so generously over the likeness of this second largest of the Philippines, sent our pulses racing. Dr. Stewart touched my arm and above the roar of the motors I could hear him shout, "There she is!"

Yes, there, stretched across the horizon and half



The author examines the skull of a brown hornbill he collected in Mindanao mountain jungles. (G. E. Kirkpatrick)

obscured by haze, lay Mindanao. Jagged mountains pushed their way through the clouds, mountains whose summits had never known the tread of Occidental feet, whose winding trails had been traversed only by wild game and the pygmy mountain people.

The plane headed directly toward the forested highlands, flying so low that we could clearly make out the limbs of jungle trees and their festoons of aerophytic plants and twisted lianas. Here and there a lacy waterfall plummeted into a bottomless gorge. We crossed the crest of the range and began at once to lose altitude. Suddenly the mountains were gone and there below us lay a broad peninsula and beyond it the sea. Rice paddies reflected the near-equatorial sun like fragments of a broken mirror. At the tip of the peninsula rose the shattered ruins of the city of Zamboanga, more like some fantastic geological formation than anything of human origin.

A truck met us at the field, collected our gear, and carried us off for a blistering introduction to the island of Mindanao. There were *carabaos,* or water buffaloes, everywhere—pulling carts with arched thatch-roofs, working in the fields, and drawing sled-like plows by the roadside. Philippine ponies, stunted and sad-eyed descendants of those imported centuries ago by the Spanish, jogged wearily along pulling two-wheeled "taxis" which squeaked and rattled. Fierce-looking pigs, not far removed from their wild ancestors, ran in packs along the road, and more than once we were forced to come to a halt while they ran from our path.

From the air, the city had appeared to be lifeless in its devastation. Now, as we drove through its winding streets, we found that out of the ruins a new Zamboanga was rising. On every side stood buildings in various stages of construction—palm-thatched buildings, not so impressive perhaps as their concrete and steel predecessors, but nonetheless they were structures which would serve well in a temporary capacity as dwellings, schools, and stores. Undaunted by the horrible experiences through which they had passed, the Filipinos had gone about the momentous task of rebuilding their lives and their civilization.

Our first month in Zamboanga was a busy one. On weekdays our time was occupied with the building and outfitting of a field laboratory; once that was completed, we began our epidemiological studies with a vengeance. We slopped through swamps, dipping questionable larvae and various other aquatic minutiae from the water, and netting, for future identification, the insects which flew overhead. We ran surveys both on service personnel and native populations to determine what internal and external parasites they might harbor. We waged a constant and moderately successful battle against the hordes of flies which swarmed through the city itself, and daily we tested samples from the sources of its water supply. Thus, during workdays there was little time for leisure.

But in the evenings and on weekends we were free to wander at will through the city and its outlying areas. Only a block from the laboratory site was the Moro Market, where Philippine Mohammedans offered their wares.

It was a seventh heaven for souvenir hunters. There were trays laden with tortoise-shell combs, bracelets, or carved pieces of ebony; there were

hammered brass bowls, sharp-bladed krises, the handles of which were inlaid with silver and mother-of-pearl; and gold rings set with malabar or gems. There were, in addition to such products as these, other more utilitarian wares—hairpins, cigarets, matches, and sandals. Fruit vendors offered mangoes, papayas, lansones, mangosteens, and other varieties strange to American tongues.

Just outside the western gate of the market glittered the murky waters of the Strait of Basilan. The Strait, which separates Mindanao from the Sulu Islands, forms a merging point of the Sulu and Celebes seas. At any hour its surface was covered by scores of Moro *vintas* on their way either to or from the Zamboanga market. When in port these slim vessels formed a bristling mass within the breakwater. Most of them had come from Basilan but some had journeyed from Jolo, Tawitawi, or even Borneo more than two hundred miles distant.

Two other features which cannot fail to interest a visitor to Zamboanga are the Fortress of Pilar and the Moro Village. The Fortress, a moss-covered structure of stone blocks, has withstood countless attacks of Moro pirates and stands amidst a grove of enormous, thick-trunked trees. The Moro Village, which lies a mile or so to the east, consists of a dense cluster of houses built on stilts out over the water. It is separated on all sides from the mainland by a narrow channel and can be reached only by boat. The location of the isolated village does not seem in any way to inconvenience the Moros who live there; and it should be of no concern to anyone who does not, for no stranger in his right mind would ever venture into its confines.

While Zamboanga proved far more interesting than Guiuan had, we found as before that the virgin country held far greater interest for us than the cities. Whenever the opportunity presented itself, we made for the forested mountains which rose like a purple wall behind the city. Sometimes we engaged the services of native guides while on other occasions we penetrated alone the edges of this vast unexplored region.

Upon one occasion we followed the boulder-studded Tumaga River up through the foothills into the mountains. Towering jungle trees bordered each bank, and beneath them the vegetation formed solid walls of greenery. Monkey troops scolded us from the treetops, and eight-foot monitor lizards scrambled from our path.

The rufous night heron is a common bird in the lowland marshes of the Philippines. (G. E. Kirkpatrick)

At one point a pack of wild pigs appeared on the river bank. Sighting us, all but the leader turned tail. The "old man," however, faced us bravely, shaking his betusked head and pawing the ground until the last of his charges had disappeared from view.

Fairy bluebirds and crimson trogons added color to a scene of green monotony, and flocks of hornbills flew overhead, trumpeting as they beat their choppy paths through the sky. But our best zoölogical find in the Tumaga River forests was a monkey-eating eagle, easily the most spectacular and probably the rarest of Philippine birds. This great raptor is among the largest of the world's eagles, yet because of its inaccessible habitat and its scarcity, it has only recently become known to science.

Such foot trips as the one along the Tumaga River course were slow-going, rigorous, and often dangerous. Many of the ravines which led from

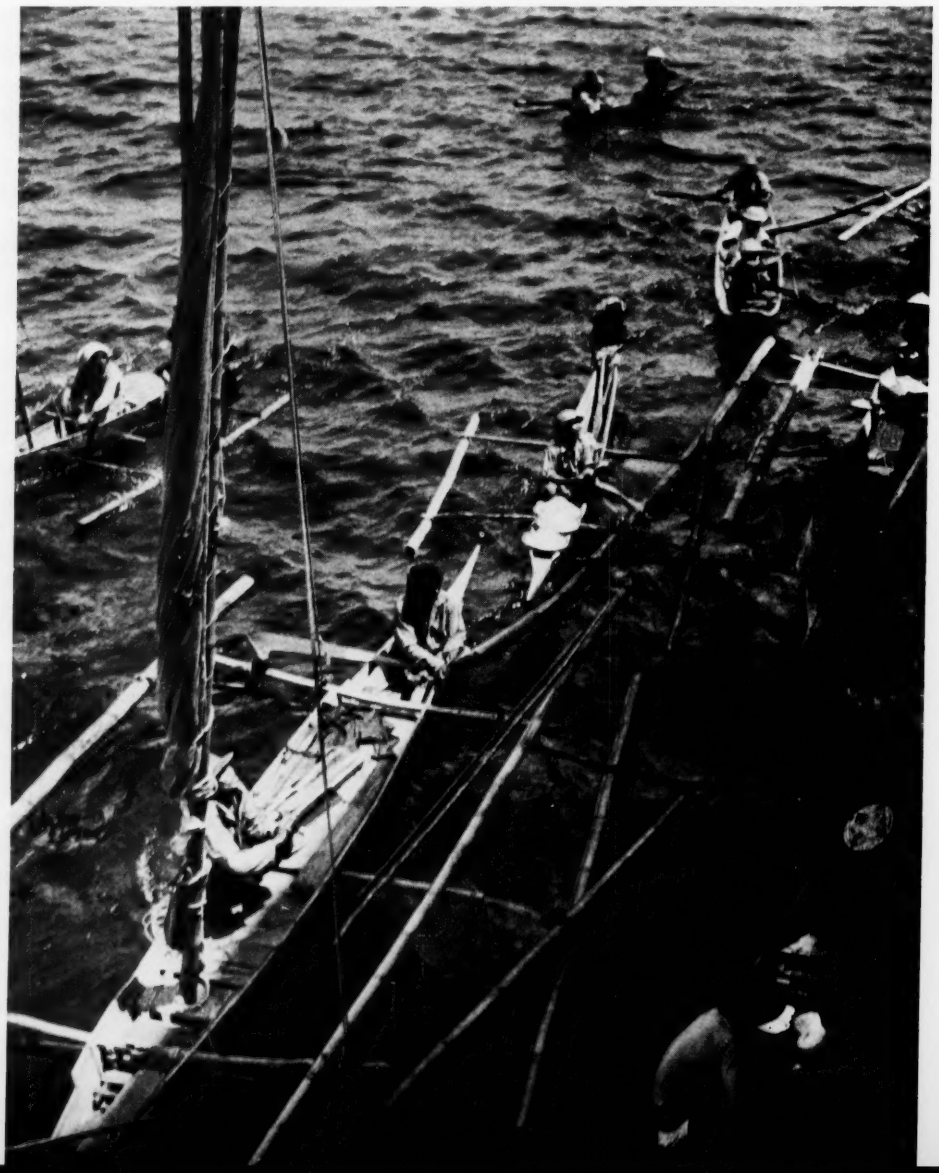
the foothills into the mountains were steep-walled and, when the bottom of the ravine was impassable, the only possible route lay along the cliffs where any misstep might mean death on the rocks far below. Sometimes the only available foothold was a loosely set rock, and it was even necessary at times to swing from foothold to foothold by means of exposed roots or dangling lianas in Tarzan fashion.

Stinging insects of countless varieties made travel through such terrain doubly unpleasant and wood leeches rendered every rest-stop anything but restful. These insidious creatures overrun the land and sit perched on the ground weaving back and forth like miniature cobras at a side show. Eventually suitable prey passes within reach and they climb aboard in a twinkling, ready to begin their meal. Cobras, including the vicious hamadryad, are common in the area and give one cause to think twice before plunging into a thicket or placing a foot or hand in any spot not clearly visible.

Travel of any sort, barring that on water, offers no degree of comfort in Mindanao except on paved city roads. Native carts rumble through the country at an agonizingly slow pace and bumpy roadbeds make motoring anything but pleasant. Yet we followed each winding lane to its end and only looked for more, for each one promised adventure and fulfilled its promise.

When orders arrived instructing us to leave the Philippines, I can honestly say we were not the least bit glad. But in the chaos of dismantling the lab and packing the equipment, we had no time to experience more than fleeting regret at leaving a place we had come to like so thoroughly.

This time, we loaded the gear aboard an LST, which was meandering through the Philippines to



Moro outriggers cluster about each steamer which enters the Zamboanga harbor. (W. W. Taylor)

The Moro village is separated from Zamboanga by a narrow channel of water. Non-Moros are seldom rash enough to enter it. (W. W. Taylor)

pick up surplus epidemiology units such as ours. The subsequent trip served as a suitable finale to our Philippine sojourn—one glorious week of wandering from one end of the archipelago to the other, stopping here and there to take another unit aboard.

We sailed on sheltered inter-island seas, through narrow, jungle-bordered straits, and on the open choppy waters of the South China Sea. We sailed to Suvic Bay and back, past Bataan and Corregidor into Manila Bay where the rusted superstructures of sunken ships still protruded above the water. We stopped in Manila only for a few hours, but that was long enough to acquaint us with the horrible devastation wrought upon this once great city. Then we turned southeast to cut through the very heart of the Philippines.

Our last view of the Philippines came at nightfall. Samar, the first island we had seen, was to be the last, and it lay purple and shadowy to the south of us. When darkness came, only the tossing buoy-lights remained. END

"Taxi!"—Cabbies doze in Zamboanga just as anywhere else. (W. W. Taylor)

JANOS XANTUS—Naturalist and Fraud

THERE ARE SEVERAL VERSIONS of everything J. Xántus did including the signing of his name. He called himself variously János Xántus, John Xántus, L. Vésey, and John Xántus de Vésey, so that students of his work are hard put to follow. Henry Miller Madden, in his life of Xántus, takes the reader through an intricate maze of contradictions. The confusion of names is only the beginning.

All natural scientists know something about Xántus. An ornithologist may recall he was the first to describe the Hammond flycatcher and the Cassin vireo, and a mammalogist that Xántus collected the types of specimens of the grizzly bear, *Ursus tularensis*, and the Tejon wood rat, *Neotoma fuscipes simplex*. There are a Xántus snake, dozens of fishes, insects, and crustaceans. The collecting which John Xántus, as he is generally known, did for the Smithsonian Institution from 1857 to 1864 bulks large in American natural history.

Briefly, the facts of his career which Henry Miller Madden has sorted from fancy and fiction are as follows. He was born János Xántus in Hungary in 1825, came to America in 1851, wandering about this country in various pursuits until 1857. From 1857 to 1859, he was in the U. S. Army, stationed at Fort Tejon, California, and there made a superb collection of California birds, mammals, reptiles, and other specimens for the Smithsonian Institution during the period that Spencer F. Baird was its head. Baird was Xántus's chief friend and protector, fighting most of his numerous battles for him—battles with his employers, which group included such stalwarts as Alexander Bache of the Coast Survey, various army superiors, the Surgeon General of the United States, and Secretary of State Seward. From 1859 to 1861, Xántus was at Cape San Lucas for the Coast Survey and at the same time collecting Lower California specimens for the Smithsonian. After two years in which he divided his time between Washington, D.C., and his native Hungary, he went to Mexico—to Manzanillo and Colima—as American consul in 1863 and 1864. His final thirty years, until his death in 1894, were spent in his own land in various scientific posts.

XANTUS, HUNGARIAN NATURALIST IN THE PIONEER WEST. By Henry Miller Madden. William P. Wreden, Burlingame, California. 1949. 312 pp., illustrated. $6.00.

On one hand, Xántus was an indefatigable collector and was responsible for the discovery of an extraordinary number of new species. Apart from these excellent scientific activities, he had a literary habit that was far from admirable. He translated into Hungarian and published in Europe under his own name several notable American works of the day—scientific publications of the United States Government.

Henry Miller Madden's book on Xántus, although it will likely stand for many years as the authentic biography and certainly top source material, does not explain the character of János Xántus. Perhaps that is a job for a psychologist and not an historian. Rather, Dr. Madden has chosen merely to record, carefully documenting as he goes, the paradoxes and all. The reader may conclude that the Hungarian naturalist was an unregenerate fraud or that he was foremost among the collectors of his day. In either case, the reader will be only half-right for Xántus was both. The documentary evidence assembled, not only about Xántus's literary failing, but concerning his very extensive collecting activities, indicates that a wider use will be found for Dr. Madden's excellent work than the limited first edition of 425 copies. It appears that the book is indispensable for libraries of natural science and is certainly fundamental where reference must be made to Xántus. It is mighty difficult to work in any branch of American natural history and not have occasion to come across the man frequently.

Dr. Madden's book is in itself something of a paradox. He has made it both simpler and at the same time more complex for historians and naturalists who refer to or quote Xántus. While he has assembled all the facts and pointed to the pitfalls, one will always have the feeling that Xántus ground may suddenly become quicksand. The task for the historian will henceforth be more difficult. First, one will have to determine whether Xántus wrote the piece and, if not, from whom it was cribbed. Dr. Madden's book furnishes the facts. If Xántus's words are to be quoted, and he did write some of his own, it will then be necessary to determine whether he is reporting the truth or indulging in fancy flights as for example the case of his telling Samuel Hubbard of the California Academy of Sciences in 1861 that he collected 92,000 specimens at Cape San Lucas of which 3,829 were new species.

The actual facts, sufficiently impressive even when accurately stated, according to Spencer Baird, are that Xántus's new species from there included "twenty birds, as many reptiles, a large number of fishes, crustaceans, and other groups in proportion." When Xántus reports chatting with Prince Maximilian of Wied at New Orleans in 1853, he has to be checked in Madden's footnotes or a life of Maximilian, either of which will show that that gentleman left America in 1834 and never returned.

During Xántus's California years, he made several trips to San Francisco where he came to know Dr. J. B. Trask, then a vice-president of the California Academy of Sciences. Xántus's propensity for insinuating friendships with leading scientists of the day might lead one to believe that he would take part in

Academy meetings. The record, however, does not show this to be true. One can only speculate on the reason for his failure to associate himself with neighbors working in the same field as he. Indeed, Professor J. D. Whitney, librarian of the Academy, in 1863, came as near to exposing Xántus's literary peccadillos as anyone up to the time the book at hand was written. The *Proceedings* of the Academy for February 16, 1863, read:

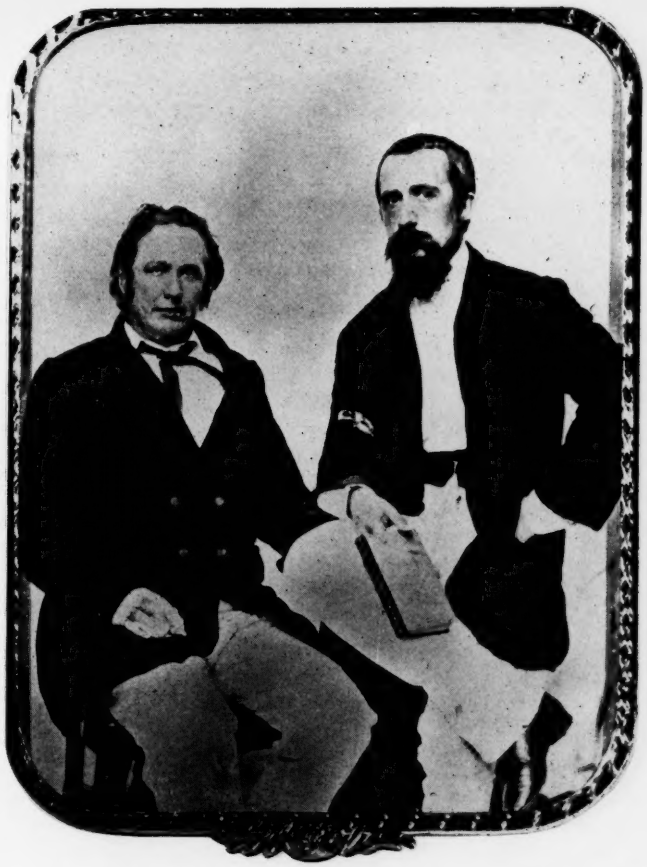
"Professor Whitney called attention to the curious errors in a paper published in Petermann's *Mittheilungen,* 1861, page 133, which purports to be a translation into German of a portion of a work published by Mr. J. Xantus, describing his journey into Lower California. He described a quicksilver mine of great importance as being worked at Marques; but the description which he gives of it shows that it is the New Almaden mine, which, in reality, he visited and which, by some confusion of his notes, he has located in Lower, instead of Upper California. No mercury mine is worked on the California Peninsula, so far as can be ascertained. It is evident that Mr. Xantus's notice of rich gold, lead, and copper mines on the peninsula must be taken with many grains of allowance."

The mercury mine, whose description Xántus had cribbed from *Hutchings' Illustrated California Magazine,* 1856, which also has a wood-cut picture of the mine, was indeed the New Almaden mine near San Jose, just south of San Francisco.

It is interesting to note that Xántus's literary frauds have gone undiscovered for so many years. This is likely due to the fact that the language in which they were perpetrated, Hungarian, is one of the most difficult of all European tongues and is infrequently used by scholars. As late as 1934, Harry Harris, writing on the "Xántus Tradition" in *The Condor,* ventured the prediction that "a republication in English of his writings . . . . cannot fail to make better understood the real importance of his place in the early development of natural history in America." This prediction backfires with the publication of Dr. Madden's exposé.

Edgar H. Yolland, under direction of Professor Joseph Grinnell, some years back, translated Xántus's *Utazás (Travels)* for the Bancroft Library of the University of California with a view to its publication. Another translation, now in the Los Angeles Public Library, was made by Nicholas Arthur Kovach.

Dr. Madden has said that his curiosity about Xántus was aroused when he learned that one of the European-published illustrations was a not even thinly disguised copy of an earlier lithograph from a U. S. Government publication. From this initial bit of detective work, Dr. Madden's excellently documented book grew. The author's thorough and scholarly work is evident in such tabulations of thirty-two passages, some as long as seven pages, from the *Utazás* and



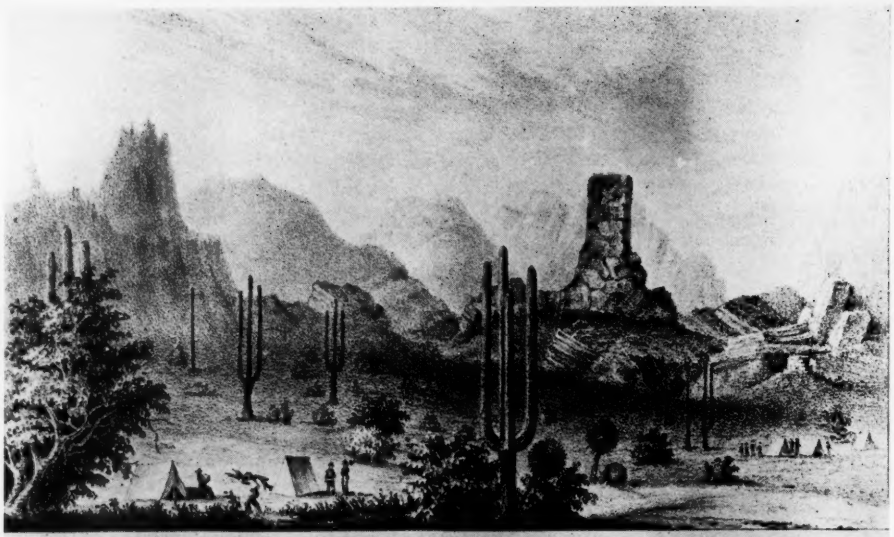
John Xántus (right) with Andrew Jackson Grayson ("the Audubon of California"), probably at Mazatlán, 1861. Xántus holds what appears to be a copy of his Utazás, *plagiarized from the Abert and Emory* Reports. *The picture is here first published. (From an original ambrotype in the Sutter's Fort Historical Museum, through courtesy of Henry Miller Madden)*

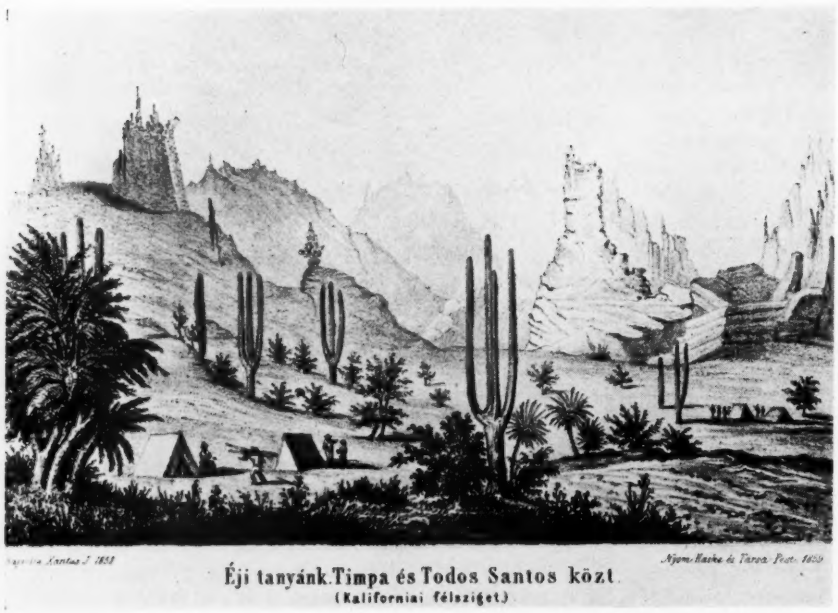
noting their corresponding line-for-line passages in the government publications: Lieut. James W. Abert's *Report of His Examination of New Mexico in the Years 1846-47* and Major William Emory's *Notes of a Military Reconnaissance from Fort Leavenworth to San Diego in 1846-47.* Xántus's earlier work, the *Levelei (Letters)* is shown to be a translation into the Hungarian of Randolph B. Marcy's *Exploration of the Red River of Louisiana in the Year 1852.*

Dr. Madden spent a year at the University of Budapest where he not only was able to make excellent use of his knowledge of the Hungarian language in tracking down elusive Xántus items, but had many source materials at hand not otherwise available. The book was his dissertation for a doctorate in history at Columbia University in 1948.

An interesting side-light (or high-light, depending on the point of view), of Xántus's activities at Cape San Lucas, 1859-1861, is reported by Madden—

This picture first appeared in print in 1848, as an illustration for Major Emory's Notes, *page 79, published by the U. S. Government. The artist, according to Emory, was "Mr. Stanly"—John Mix Stanley, who illustrated a number of the Western exploration reports.*





An amazingly similar sketch signed "Xántus J., 1858," was published in Pest in 1860 as the frontispiece for Xántus's Utazás, *and labeled "Our Night Camp, Between Timpa and Todos Santos." This is reproduced from one of the rare copies of the* Utazás *which is owned by the Library of the California Academy of Sciences. In Hungarian, or Magyar, the surname stands first, so our hero becomes Xántus János at home.*

"another monument to Xántus's fecundity." In 1940, he reports, some visitors to the Cape were shown three little Indians as "Xántus's great-grandchildren" and were told of a large family of Xántuses in the town and a few miles back in the hills, of a whole tribe.

This bears out an earlier story reported by a Curator from the California Academy of Sciences who visited Baja California in 1919. He was approached on the street by an old man who introduced himself, proudly: "I am John Xántus's son. My mother told me so!"

There is no doubt but that John Xántus was a collector-giant in his day, certainly one of the foremost of those who provided the specimens on which classification and description of American natural history rests. His superb collections for the Smithsonian Institution form the basis for much of our knowledge of the fauna of western United States and Lower California. These records will always stand and will serve his name in good stead when his less fortunate characteristics become more widely known and serve to tarnish the "Xántus Tradition."

REVIEWS

SEQUOIA AND KINGS CANYON NATIONAL PARKS. By John R. White and Samuel J. Pusateri. Stanford University Press. 1949. xviii + 212 pp., 34 photographs, 11 drawings, 7 maps. $3.00.

In 1930 the reviewer was privileged to have a hand, as illustrator and cartographer, with Ansel F. Hall (then Chief Naturalist, National Park Service) in his excellent little *Guide to Sequoia and General Grant National Parks.* The present guide, by the man who served a quarter century as superintendent first of Sequoia and later of the combined parks, in collaboration with Mr. Pusateri, a naturalist and ranger who "has devoted several years to the scientific study of the various features of the two parks," is more than worthy successor to the Chief's. Mr. Hall was one of the pioneers of educational and public information services in the national parks system. His compact, attractive little guides to Sequoia and Yosemite parks filled a need, in years of expanding services to and use by the public, for ready pocket information. Now Colonel White, Mr. Pusateri, and the Stanford University Press have produced what is surely a model for national parks guides or manuals fully adequate to an era of maturity if not of maximum—some say more than optimum—development.

For this beautifully written, handsomely printed book (the limp but sturdy cover acknowledges its intent as handy if not pocket-size manual) is addressed to the mature, thoughtful, civilized users of national parks, who do not want to see them become merely resorts. One feels that authors and publishers must have worked together to appeal to those most appreciative of the higher values of the parks: true *re*creation through enjoyment of the most sublime in nature.

They are the visitors who understand the dilemma of park officers "charged with the responsibility for preserving unimpaired the scenery and natural objects, while at the same time permitting those sometimes fragile things to be visited by the millions." They are the ones who will enjoy the sections on park history, who will want answers to intelligent questions about the Sequoias, who will look for descriptions of the principal species of plants, trees and shrubs, birds, and animals. These are the people who would rather walk the trails into the High Sierra than shuffle around a hotel dance floor—there is a chapter for them. Among them are the ones who will read of "The Forests That Were" and resolve to help end destruction. For such users of this book it was no waste to include, in smaller type in the back, the "Magna Charta of the National Park Service," the "Statement of National Park Policy," Colonel White's address on "Atmosphere in the National Parks," and other "Miscellany" such as the origin of place names, mountain elevations, and a well selected bibliography. This is, in short, the book for *PD* readers. D.G.K.

EXPLORING OUR NATIONAL PARKS AND MONUMENTS. By Devereux Butcher. Second edition (revised). Prepared under the auspices of the National Parks Association. Houghton Mifflin Company, Boston. 1949. 224 pp., 227 photographs, 2 maps. Paper, $2.00; cloth, $3.50.

This is a concise but splendidly illustrated description of our national parks and monuments (excluding the strictly historical); it is also propaganda. New and finer edition of a familiar work, it coincides with a great uneasiness about the future of what most of us have long taken for granted—the inviolability of these areas set aside in the name of all the people. The National Parks Association, of which Mr. Butcher is executive secretary, exists to keep the public informed of threats to parks and monuments and help them fight the interests that, openly and under various guises, continually chip away at their acreage for private gain. Not only does this book try, through attractive format, to win friends for the parks and the great ideal behind them; it tells what is being done to undermine them (not always by lumbermen, stockmen, and other private concerns but, in some cases, by government agencies whose legitimate concerns make for conflict).

The book closes with interesting statements by Newton B. Drury and Harold J. Coolidge. D.G.K.

EDITOR, *Pacific Discovery*

SIR:

Let me thank you for (Dr. Miller's) editorial, "Star Dust," in the March-April *PD*. That editorial should be widely read as a correction to the notices of Velikovsky's fantastic nonsense that has appeared even in such magazines as *Harper's*. Is there no limit to the credulity of the half-baked mind?

All that we can do to counteract these vagaries is to spread the knowledge of the universe as it is gradually revealed to the student of nature; and *PD* is helping greatly in that work. I congratulate you . . .

ROBERT G. AITKEN
Director Emeritus, Lick Observatory

Berkeley, 25 April 1950.

SIR:

I was highly pleased to see the blast you aimed at *Worlds in Collision* in the latest number of your excellent magazine *PD* . . . and wish it could be read by everyone who has been exposed to the magazine propaganda which has been going the rounds. J. HUGH PRUETT

Eugene, 15 May 1950.

SIR:

Everyone who appreciates the natural beauty of our western mountain country should be grateful to Dr. Bradley for his excellent article "Yosemite's Problem Road" in the January-February *PD*. The pity is that it could not have been written and its message impressed on our park and forest administrators twenty or more years ago. Perhaps then some of the irreparable damage that has been visited on more than one of our western beauty spots by modern road construction might have been averted . . .

It was with regret that I noted the abandonment, a few years ago, of the old Big Oak Flat entrance into Yosemite Valley. The new road is a marvel of construction and passes through some very attractive country but it cannot offer that sudden breathtaking view of the Valley that one formerly got just after leaving the Gentry control station. Seen in the late afternoon, with the sun on Bridal Veil Falls, it left an impress on the first-time visitor that he never forgot and that none of the present-day routes can match. I realize that administratively the old road was an expensive headache but that does not lessen my regret that I can no longer give friends their first introduction to the Valley by that route or re-experience the thrill of that view myself.

In the case of the Gentry route, no destruction of natural scenic values was caused by its abandonment and there were good reasons for closing it, but in numerous cases of road improvement in our scenic mountain areas one can find little reasonable excuse for what amounts to scenic vandalism by those responsible for road construction. In too many cases, road standards and accessibility seem to be everything and a sense of natural values and of the ruinous effect that a modern road may have on them totally lacking.

It is not too late to try to prevent further despoilation of this kind. WILLIS W. WAGENER

San Francisco, 24 April 1950.

V.I.P.'s

IN THE YEAR 1949 TWO MILLION PEOPLE, two and a half times the population of San Francisco, passed through the doors of the Academy's buildings in Golden Gate Park. Some came because they wished to learn, some came because they were brought by friends who were showing them the city, some wandered in because they happened to be in the park on a sunny afternoon. Whatever the reasons for their coming, one may safely say that every one of those two million visitors went away with more knowledge than he had when he came in—with greater understanding of the world about him. For it is impossible to walk through these halls, even in careless or casual mood, without learning something of value.

The visitor may be a nature lover who finds in our carefully worked-out habitat groups an answer to his questions regarding the relations of animals to their environment. He may be an amateur ornithologist who finds in our Hall of Birds the particular bird he has been trying to identify.

If he likes minerals, we have a large and well arranged collection, and are adding to it week by week. If he is an amateur mycologist, i.e., if he collects mushrooms and hopes to live to tell the tale, he can compare his specimens with the accurate models of edible and poisonous fungi we have on exhibit. If he is interested in fish – as a sportsman, a tropical fish fan, or otherwise – in our Aquarium he can look and linger and dream.

If he is a small boy collecting butterflies or beetles or minerals or shells, he can bring them here and learn their names, and find out how to make and keep his own collection. There is no person nor personage more welcome in this institution than a small boy with something clutched in his fist that he wants to know the name of.

In the new addition soon to be opened we shall be even better equipped to contribute to the education of young and old, to teach the lesson of man's place in nature, and the place of his world in the starry universe.

—"Report of the Director," *California Academy of Sciences Annual Report for the Year 1949*

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